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VARIOUS TECHNIQUES OF UMBILICAL HERNIA REPAIR A PROSPECTIVE ANALYTICAl STUDY

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M.S ., (GENERAL SURGERY)

DECLARATION

This is consolidated report on " VARIOUS TECHNIQUES OF UMBILICAL HERNIA REPAIR A PROSPECTIVE STUDY " , based on cases treated in government rajaji hospital , MADURAI during the period November 2011 to November 2012 .

This is submitted to the tamilnadu Dr .M.G.R .MEDICAL UNIVERSITY ,CHENNAI in fulfilment of the rules and regulations for the M.S., degree examination in GENERAL SURGERY .

CERTIFICATE

This is to certify that this dissertation VARIOUS TECHNIQUES OF UMBILICAL HERNIA REPAIR – A PROSPECTIVE STUDY submitted by DR.T .ASHOK KUMAR to the faculty of general surgery, The Tamilnadu Dr. M.G.R .Medical university, Chennai in partial fulfilment of the requirement for the award of MS degree Branch I General Surgery ,is a bonafide research work carried out by him under our direct supervision and guidance from November 2011 to November 2012.

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I, Dr.T . ASHOK KUMAR solemnly declare that the dissertation titled VARIOUS TECHNIQUES IN UMBILICAL HERNIA REPAIR – A PROSPECTIVE STUDY has been prepared by me. This is submitted to The TamilNadu Dr. M.G.R. Medical University, Chennai in partial fulfilment of the regulations for the award of MS degree (Branch I) General Surgery.

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DATE:

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CONTENTS

INTRODUCTION

HERNIA :

Hernia is derived from the latin word rupture .A hernia is defined as an abnormal protusion of an organ or tissue through a defect in the surrounding walls . [1]

UMBILICAL HERNIA : Protusion of abdominal contents (intestine and omentum) through a defect in the umbilicus

In hindu physician's charka 's writings ,in AD 1 the earliest writings of formal recordings of umbilical hernia were recorded .

In the first century ,recordings dated the treatment of umbilical hernia with elastic suture by celsus .

Hippocrates used the greek term *hernios* for the bulge in the abdominal hernias .[15]

The **ebers papyrus** ,from approximately 1500 BC detailed the use of truss .the observations in this papyrus are " when you judge a a swelling on the surface of the belly ..... what comes out .....caused by coughing ." [2]

Umbilical hernias were first described in the first century ,but only in 1740 **william cheslden** reported the first repair .

William mayo was the first person , who popularised the " vest over trousers " ,overlapping repair in 1901 .

World wide umbilical hernias are more common in people of African descent .

Data from devolping countries are limited ,hence exact prevalence and incidence cannot be made out .

Of all hernias ,ventral hernias represent 10 % of them .Umbilical hernias represents 3 % of them .

Umbilical hernias occur more commonly in infants ,and most often these spontaneously close before the first year of life ,and only 2 – 10 % persists in children older than 1 year of life .

Incidence of umbilical hernia is equal in children .In adults ,it is three times more common in women than men .

AIMS OF THE STUDY

Aims and objectives of the study

A study of cases of umbilical hernia ,during a period of one year from the month of November 2011 and November 2012 .

1 . To study the effectiveness of laparoscopic umbilical hernia and open umbilical hernia repair .

2 . To study the incidence of surgical site infections between open umbilical hernia repair and laproscopic umbilical hernis repair .

3 . to study the effect of post operative pain and morbidity between open umbilical hernia and laproscopic umbilical hernia repair.

4 . to study the rate of recurrence between open umbilical hernia and laproscopic umbilical hernia repair

REVIEW OF LITERATURE

William cheslden was the first person to report umbilical hernia repair as early as 1740 ,but the procedure was popularised only by MAYO by the " vest over trousers " technique .

UMBILICAL HERNIAS are classified into three categories according to the age of presentation :

1 . Congenital type also known as the Omphalocele .

2 . The Infantile Type

3 . The Adult Umbilical Hernia

OMPHALOCELE : [3]

It is also known as exomphalos ,it is a midline defect ,the herniated viscera is covered by a membrane .

The layers are :

1 . The Peritoneum in the Inside

2 . Wharton 's jelly

3 . Amnion outside .

The umbilical vessels insert over the membrane and not on the abdominal wall .the defect may be in the upper,mid or low abdomen .

Abdominal wall is formed by the infolding of the cranial ,caudal and two lateral embryonic folds .the intestines due to their rapid growth migrate outside the abdomen at about six weeks of gestation ,and normally return back into the abdomen in 10 -12 weeks of gestation .

In exomphalos, these intestines do not return to their original position and stay out of the abdomen .various organs ranging from the intestines, liver and spleen may lie outside.

When these are associated with anterior diaphragmatic hernia ,sternal cleft ,pericardial /cardiac defect it is known as PENTOLOGY OF CANTRELLL .when exomphalos is present in the lower abdomen may be associated with bladder or cloacal exstrophy .it may also be associated with trisomy of 13,14, 15, 18 , 221 and also beckwidth –widemann syndrome ,and hurler syndrome .

Incidence is about 3 per 10000 live births, and male to female ratio is equal .

Omphalos is also associated with GERD ,cryptorchidism, musculoskeletal disorders and neural tube defects .it is easily identifiable by prenatal ultrasound at the second trimester of pregnancy .

Treatment options varies with the size of the defects and associated congenital malformations: when the baby has severe pulmonary

hypoplasia ,closure of the abdomen is impossible .wound is taken care by topical antibiotic agents ,until the wound epithelizes and the subsequent hernia is treated afterwards .

Smaller defects are closed primarily ,the umbilical vessels are ligated and neoumbilius can be created .large or giant omphalos may be treated with short term\long term silos and staged closure can be done after six weeks using skin flaps . postopeatively respiratory and nutritional support is given .

Omphaloceles have normal gastrointestinal function but are associated with severe congenital malformations hence survival rate is around 60 % only .

INFANTILE UMBILICAL HERNIA :

Umbilical hernia in children is usually congenital ,and is the most common umbilical disorder in infants and children . they usually close before one years of age .they are seen in 10 % of Caucasian babies but are more common in babies of African descent .

Many studies have shown that fibrous proliferation around the umbilical ring occurs as late as 2 to 3 years and after that the rate of spontaneous closure decreases greatly .the rate of centripetal contraction in the defect of the umbilicus is as much as 18 % of the area of the defect per month .

Strapping of the umbilicus relieves the parents anxiety but is of doubtful value to the child .the prognosis for the supraumbilical hernia to close spontaneously is poor ,but after the ambulation of the child the rate of closure of all umbilical hernias increases .

Most of the umbilical hernias close spontaneously by the age of one year and 90 % resolve by 5 years .the hernia protrudes only when the baby cries and this condition is not painful and strapping of the umbilical hernia should be avoided since it may cause allergy and skin breakdown .

Surgical treatment for umbilical hernia in this group demands only when symptoms like incarceration ,strangulation ,or rupture occurs .

HERNIA OF THE UMBILICAL CORD :

this is a very important conditions in infants and should be differentiated from infantile umbilical hernia .

this is herniation of the bowel into the umbilical cord and bowel loops lie at the base of the umbilical stump and may be prone for injury by the umbilical clamp .this is essentially a small omphalocele and should be closed immediately .

ADULT UMBILICAL HERNIA :

Umbilical hernia is a common frequently encountered problem in clinical practice but is infrequently discussed in the medical literature .

EMBRYOLOGY :

The body stalk and the ductus –omphalo-entericus together with the umbilical coelom are enveloped by the amnion and the umbilical cord is formed .two membranes of the amniotic cavity come in contact ,the two extra embryonic mesoderm fuses .the embryo flexes and the amnion encircles the structures in the umbilical cord .

The umbilical cord around the eight week is short and thick enclosing the following structures [18]

1 .The Ductus –Omphalo –Entericus

2. Two Vitelline Vessels

3 . The Umbilical Coelom

The extra embryonic coelom is connected to the intra embryonic coelom by the umbilical coelom .further devolpment of the amnion ,leads to the lengthening of the umbilical cord .

The structures which degenerate are

1 . The Omphalo – Enteric Duct (it can remain in the form of meckel ‘s diverticulum)

2 . The Umbilical Vesicle (forms the medial umbilical ligament lying medially in the adults)

3 . The Extra Embryonic Vitelline Circulation

4. The Umbilical Coelom

Finally only the body stalk remains (2 arteries and 1 vein) with the coverings of amnion layers .the connective tissue of the amnion form the so called ‘wharton ‘s jelly ‘made largely from mucopolysaccharides .

After the delivery of the baby ,even in the absence of external interventions ,umbilical cord physiological occlusion occurs after birth by the collapse of the wharton’s jelly and vasoconstriction of the vessels .

A natural clamp is created ,halting the flow of the blood .this clamping takes less than three minutes in air birth takes more than five minutes in water birth .within the baby the umbilical vein closes up and degenerates into the round ligament of the liver ,and the ductus venous closes up and degenerates into the ligamentum venosum .

The umbilical artery partially closes up degenerating into the medial umbilical ligament ,and the remaining parts are retained as a part of the circulating system .

After the birth ,the remaining end of the umbilical cord shrivels and dries off leaving behind a healthy and healed umbilicus in about 7 to 10 days in a healthy term neonate .during this process any contamination or sepsis may lead to umbilical sepsis and formation of umbilical hernia later on in the adult life .

LAYERS OF THE UMBILICUS : [8]

Layers of the anterior abdominal wall namely

1. Subcutaneous layer of fat
2. Superficial fatty layer of fascia camper
3. Deep membranous layer of scarpa

All these layers are fused together in the region of the umbilicus ,and the surrounding deposition of the fat makes the umbilicus look like it is depressed .

PATHOPHYSIOLOGY OF UMBILICAL HERNIA :

Pathophysiology in infantilie umbilical hernia , usually the obliterated umbilical vein which forms the round ligament of the liver typically attaches to the inferior border of the umbilicus thereby providing strength to the umbilicus .

In 25 % of the infants this round ligament of the liver attaches to the superior border of the umbilicus thereby leaving the inferior border

composed of only peritoneum and umbilical fascia leading to weakness and formation of infantile umbilical hernia .

Pathophysiology in adult umbilical hernia varies in the sense ,too much intrabdominal pressure can cause umbilical hernia formation .

Abnormal decussation of fibres in the linea alba can also lead to the devolpment of umbilical hernia in adults .

In adults ,the umbilical hernia does not seem to be related to the persistent juvenile umbilical hernia since only 10 % of the patients report childhood herniation .hence the adult umbilical hernia is a acquired herniation through the umbilical canal due to increased abdominal pressure .

The fusion of the ectoderm and the embryonic mesoderm ,forms a fascial defect for the passage of the umbilical vessels .after birth the thrombosis of the vessels occur ,thereby promoting the contraction of the umbilicus by cicatrisation .hence the weakest area in the umbilicus is the area between the umbilical vein and the superior end of the umbilical ring .

This weakness is due to the relative lack of elastic fibres in the umbilical vein .in adults the margins of the umbilical canal is umbilical fascia from the behind ,linea alba from the front and medial edges of the rectus sheath from the side .

CAUSATIVE AND RISK FACTORS :[16]

1 . Low birth weight :

Umbilical hernia is a very common problem in babies with low birth weight .80 % of infants weighing less than 1200 gm have a certain amount of transient umbilical hernia when compared to other babies , due to prematurity of the umbilical ring .

2 . **Trisomy 13 :**

Also called as PATAU syndrome occurs in 1in every 10000 births .newborns have cleft lip /palate ,umbilical / inguinal hernia ,severe mental retardation ,seizures ,single palmar crease and polydactly .

3 . **Trisomy 18 :**

More common disorder ,affects girls more than boys ,occurs in one in every 3000 live births . also known as EDWARD SYNDROME .newborns present with rocker –bottom feet ,microcephaly ,pectus carinatum ,VSD , mental retardation ,recti diastasis and umbilical hernia .

4 .**Trisomy 21 :**

Also known as DOWN SYNDROME ,most frequent viable chromosomal disease .occurs in 1.5 of every 1000 live births .new borns present with

microcephaly ,brushfield spots in iris ,clinodactly of fifth finger ,saddle toe ,VSD ,umbilical hernia and duodenal atresia .

5 . Congenital Hypothyroidism :

Congenital thyroid hormone deficiency ,occur in 1 in every 4000 live births ,if untreated can lead to growth failure and mental retardation .babies present with excessive sleeping ,poor muscle tone ,larger anterior fontanelle ,exaggerated jaundice ,umbilical hernia and macroglossia .umbilical hernia is due to poor muscle tone .

4 **. Mucopolysaccharoides**

MPS 1 also known as hurler ‘s syndrome ,which has deficiency L – iduronidase enzyme .the stop devolping at the age 2 to 4 years .they babies are large may have inguinal or umbilical hernia .they also distinct facial features (bulging forehead ,depressed nasal bridge) are present .

5 **. Marfan’s syndrome**

Marfan ‘s syndrome affects in every one in 5000 of live births . it is a autosomal dominant disorder of the connective tissue .structures in the body like the blood vessels ,ligaments ,joints are supported by the connective tissue . these structures are weakened and the joints ,heart are affected . many of the patients have umbilical and diaphragmatic hernia .

6 . **Beckwidth – Widemann Syndrome**

Also known as overgrowth syndrome .growth is asymmetrical and the pattern is known as hemihyperplasia . many of the patients have omphalocele and umbilical hernia and have macroglossia , visceromegaly and hypogylcemia .beckwith – widemann syndrome is present in 1 in every 12000 live births .

7 . African /Afro American Descent

There is a distinct race prelidiction for umbilical hernia in the world .children of African descent and afro American descent have greatly increased incidence of umbilical hernia . in one study ,African children less than six weeks of age had a incidence of umbilical hernia 0f 32 % and at one year of age the incidence was 13 % .

8 **. Umbilical sepsis**

Umbilical sepsis or omphalitis occurs in the newborn period .babies who are premature , decreased immune function ,prolonged birth are at a higher risk for omphalitis .most commonly caused by bacteria such as staphylococcus ,streptococcus and Escherichia coli .

This infection in a early age can cause delayed closure of the umbilical ring and cause umbilical hernia .

9 .**Obesity**

obesity can cause increased build up of abdominal pressure against the abdominal wall .children and adults who are obese have a more significant risk of devolping umbilical hernia than those counterparts who are normal in height and weight .excess fat infiltration into the muscles causes weakness of the abdominal muscles and leading to the devolpment of umbilical hernia .

10 . **Smoking**

Smoking is the main reason for a person to devolp COPD .in a COPD patient ,chronic coughing leads to increased intrathoracic pressure which can lead to development of umbilical hernias .

Excessive smoking can lead to decreased collagen synthesis and cross linking ,alters the extracellular matrix causing weakness leading to development of hernias .

11 . **Multiple Pregnancies**

Umbilical hernias are more common in multiparous women due to the fact that mutiplie pregnancies causes weakness of the abdominal wall and each pregnancy causes increased intrabdominal pressure .subsequent pregnancies increase the risk of umbilical hernia .

12 . **Fluid In The Abdomen (Cirrhosis With Ascites)**

There is a 10 % increased risk for patients having liver disease with ascites to devolp hernias ,most commonly umbilical hernias . nowadays spontaneous rupture and leakage of ascitic fluid in uncommon in these patients . since the complications such as strangulation in these patient pose a significant risk ,surgery is indicated and has good prognosis provided the hepatic function is good .

13 . **Increased Intrathoracic Pressure (Copd ,Asthma)**

As said earlier increased intrthoracic pressure causes devoplment of umbilical hernia in these patients,and are the main cause of recurrence if let untreated .

CLINICAL FEATURES OF UMBILICAL HERNIA :

SWELLING :

Umbilical hernia usually presents as a swelling at or near the umbilicus ,in babies it is usually evident while the baby cries ,coughs and strains . the swelling may disappear when the baby lies down . [9]

In adults the swelling is obvious ,the swelling may increase in size while bending ,coughing and may reach bigger sizes if let untreated .

PAIN :

umbilical hernias are painless in children

In adults they may feel a dragging type ,pricking type of pain occasionally .the reasons of the pain are not clearly defined ,but may be due to the adhesions in the abdomen .

only when the umbilical hernia becomes larger in size acutely,becomes distorted and the develops severe pain ,abdominal distension with vomiting ,these ominous signs heralds the onset of strangulation or incarceration in the patient and should be attended as early as possible .

umbilical hernias are more notorious for incarceration ,strangulation and obstruction than other hernias due to a relatively narrow neck .

VARIOUS SURGICAL TECHNIQUES OF UMBILICAL HERNIA REPAIR :

In utero ,umbilicus has a vital role ,but after birth it has only minimal significance .the umbilical cord may be used for venous acess after birth ,and the umbilical artery and umbilical vein may be used for catherisation by the neonatologists .

The umbilicus may be frequently affected by sepsis a term known as omphalitis .

The psychological part of the umbilicus has been studied , in persons where the umbilicus has been removed surgically. Umbilical hernia is a frequently encountered problem by the surgeons in the past , present and the future .

MAYO TECHNIQUE : [4]

William james mayo M .D , F.A.C.S., (june 29 ,1861 – july 1938) was a surgeon in the united states of America .he earned his degree in the university of Michigan in the year 1883 .he devolped the " vest over technique " for the umbilical hernia repair . [1]

This well known technique goes back to 1895 , Dr .william mayo devoled this technique still performed and known as the mayo ' s operation .

Mayo was the first surgeon to perform vertical overlapping technique to repair umbilical hernia . he overlapped adjacent aponeurotic structures .

The technique of overlapping aponeurotic structures vertically , the "vest over technique " secured a wide area of adhesions .

The results of the mayo studies were published in the year 1901 and 1903 .in this study he has done about 25 repairs ,all with good results and no recurrence .

The conventional technique of mayo operation is still been done all over the world .not only for the repair of umbilical hernia but also for the repair of epigastric hernia and incisional hernia .

Schumpelick and kingsnorth has explained the mayo operation ,which is as follows ,

The abundant skin over the hernia sac is excised and the abdominal wall is cleared all around the defective fascia .

The hernia sac is cleared from the fibrous coverings .the contents of the sac is inspected after the opening of the sac .any adhesion or scar tissue between the abdominal viscera is carefully dissected .

The steps explained above detail the steps of the standard exploration ,now the standard mayo operation is explained as below , [13]

STEP 1 :

The peritoneum is closed continuously with a absorbable suture so as to prepare the defect for the overlapping technique .

STEP 2 :

The overlapping fascia is cleared of the underlying peritoneum from its attachements.

STEP 3 :

The doubling of the fascia begins 3 cm from the overlay fascia with nonabsorbable sutures with a loop taken in the underlay fascia .

STEP 4 :

The free margin of the overlay fascia is fixed with nonabsorbable sutures to the abdominal wall .

STEP 5 :

Lastly , to reduce the tension relaxing incisions are made over 5 cm from the suture lines on the rectus sheath or the aponeurosis .

This technique was almost revolutionized the world in the first half of the century and inspired the surgeons all over the world .however this surgical technique has not lived upto the promise and only few randomised trials are there in the world .

The recurrence rate after mayo ‘s repair are somewhere between 20 % to 28 % .

This technique has lost it’s upper hand and many surgeons do not follow this operation but still it is practised in many parts of the world .

In the fifth edition of nyhus and condon’ s hernia david benett writes that the classic Mayo ‘‘vest-over pants’’ technique had one major fault in that

the bursting strength of the wound was directly impaired to a degree proportional to the overlapping and tension .

Benett's opinion were :

To suture a defect primarily with nonabsorbable suture with edge to edge repair .prosthesis repair in case of a large defect ,not to create a new umbilicus as it increases the chance of recurrence .

Umbilical hernia repair with primary closure :

STEP 1 : THE INCISION :

Skin is prepared and sterile drapes are applied and a curvilinear incision is placed either over the umbilicus or below the umbilicus , this incision may be hidden under the abdominal wall .the incision should not extend beyond 180 % .

STEP 2 : DISSECTION OF THE SAC :

After the subcutaneous tissue is incised the bleeding points are cauterised . a dissection plane is created between the subcutaneous tissue and the hernia sac which leads to the defect in the rectus sheath .

The dissection is carried out all around the hernia sac both in the upward direction and lower direction till the sac is encircled .the sac is cut off from the umbilicus such that a buttonhole is not created which increases the chance of infection and umbilical necrosis .

The dissection is carried out to a variable distance so that the closure of the fascia does not distort the periumbilical skin .

STEP 3 : OPENING OF THE SAC :

After the sac is cleared of it fibrous covering ,the sac is opened and the contents are inspected and reduced accordingly .

The excess sac is excised and the defect is closed with a nonabsorbable or absorbable suture according to the size of the defect and patient .

for youngsters and children the size used is 2-0 and 3-0 is used for infants and children .

STEP 4 : SIMPLE UMBILICALPLASTY :

The umbilicus is maintained in inverted position by fixing the undersurface of the umbilicus to the fascia of the abdomen and the excess periumbilical skin may be fixed to the fascia additionally by interrupted absorbable sutures .

STEP 5 : CLOSURE :

A fine absorbable sutures may be used to close the dermis ,and absorbable sutures are used to close the skin to avoid post surgical site infection .

Some paediatric surgeons may use colloidon dressings in infants and some advocate pressure dressings to avoid post operative seroma or hematoma formation .

OPEN REPAIR TECHNIQUE WITH MESH (ONLAY ,SUBLAY ,INLAY): [5]

These surgeries can be usually done under spinal anaesthesia as it provides good relaxation .

General anaesthesia in the form of inhalational anaesthetics can also be used for infants and smaller children .

PREPARATION :

The patient is placed in a supine position in the operating table .

The skin is prepared all around the operative field and the umbilicus is cleaned thoroughly and cotton swabs with antiseptics may be necessary to reach the deep crevices of the umbilicus .

INCISION AND EXPOSURE :

The most common incision used is a curved incision around the umbilicus superiorly or inferiorly ,so that the umbilicus is retained in the skin flap .in case of large hernias a vertical incision may be necessary .

The sac is easily separated from the adjacent structures by a combination of both sharp and blunt dissection ,and the dissection where the sac is attached to the umbilicus is carefully dissected since over enthusiastic dissection will result in a post operative umbilical necrosis and may lead to mesh infection and disastrous complications .

The neck of the sac is clearly dissected all around the level of linea alba and rectus sheath .the contents of the sac is mostly omentum ,but frequently the small bowel and large bowel may also present as the contents .usually the omentum in chronic long standing hernias may form adhesions between the sac and omentum thereby preventing the reduction of the sac .

Sharp dissection is often required to release the adhesions between the sac and if there is a strong suspicion of gangrenous bowel ,the peritoneal cavity is opened through a midline incision and the bowel is well inspected and resected or reduced according to the needs .

Sometimes it is wise to clamp and divide the incarcerated omentum ,and reducing it after ligation into the peritoneal cavity .when the contents have been reduced ,and the sac and defect well defined ,excess sac is cut and the defect is closed with a non absorbable suture either no 1 prolene or no 1 ethilon .

When the size of the defect approaches 2 to 4 cm ,primary closure techniques have a higher rate of recurrence hence some surgeons prefer mesh hernioplasty . the placement of the mesh should be such that the mesh overlaps the defect by atleast 3 to 5 cm all around .

The plane posterior to the defect and the posterior rectus sheath is been preferred by some surgeons .when the plane between the peritoneum and the posterior rectus sheath is freely dissected ,surgeons after confirming that the omentum is not attached directly behind the umbilical hernia place the polypropylene mesh .

If this plane could not be reached ,alternatively the mesh can be placed in an intraperitoneal position . a dual sided mesh is placed where the nonadherent smooth surface containing the polytetrafluroethylene (PTFE) side is posterior facing the bowel and omentum preventing the formation of post operative adhesions later .the other side containing the polypropylene is facing towards the peritoneum and the abdominal wall .

The mesh should be placed such that it extends about 3 to 5 cm all around the defect and it is fixed to the abdominal wall by full thickness sutures through the linea alba care not to take the polytetrefluroethylene side so that there is a possibility of catching a loop of bowel .

After achieving complete hemostasis ,the umbilicus is inverted by fixing the undersurface skin to the linea alba .if the hernia is large ,a closed sialastic suction drain is used through a adjacent stab incision and the scarpa's fascia is closed .

COMPLICATIONS OF OPEN UMBILICAL HERNIA REPAIR :

The invention of prosthetic mesh has brought about a change in the outlook of hernia surgeries , since it has been thought that the prosthetic mesh would decrease the incidence of recurrences . it rapidly gained global acceptance and popularity for it wide range of uses .

Now there is a rapid increase in hernia repair after the introduction of the mesh .

But the prosthetic mesh has it 's own pitfalls ,and a number of complications have been reported after the use of mesh some of which have been discussed below ,

1 .SEROMA FORMATION :

A seroma is loculated collection of fluid that sometimes occur after surgery , especially after prosthesis repair .it may occur after repair of large hernias .

Some persons ,perceive that the seroma is a body 's reaction to a foreign body to encapsulate it . the fluid that collects may come from the injured

blood vessels that leak plasma or from the dying or injured cells due to inflammation .

They usually devolp in first week ,and they may be a concern to the patient evoking a possibility of recurrence . the incidence may vary from 1 % to 38 %.

The reasons for a seroma formation are :

A . Wide dissections ,

B . use of excessive electrocautery ,

C . use of sharp suction cannulas ,

D . excess skin excised

E .potential space after repair of large hernias .

The disruption of vascular and lymphatic channels may be the reasons for seroma formation and use of drainage catheters may prevent it .physical examination may show a compressible swelling at the site of surgery .

Other techniques such as quilting sutures ,tension closing sutures and preserving the fascia above the external oblique and rectus sheath may prevent the formation of seromas .

Seromas are more uncomfortable and less likely to cause pain .treatment options may include aspiration ,sclerotherapy , placement of drainage

catheters ,excision of seroma cavity .aspiration may be avoided and only done when the seroma persists for a longer period since secondary infection may be introduced .

2 . MESH INFECTION :

The first use of prosthetic mesh was by usher in 1950 for inguinal hernias ,since then numerous advances have been made in the mesh technology for the repair of various type of hernias .prosthetic mesh can induce various types of changes in the body such as foreign body reaction ,calcification, thrombosis and infection .

An ideal mesh should be easy to handle ,inert ,provide adequate strength ,resist contraction and infection ,should not resist patients function and be simple and cheap to manufacture .in a recent study the incidence of infection and other complications were studied for different types of mesh and it was found out that the multifilament polyester mesh resulted in a higher rate of complications than the monofilament or woven polypropylene type of mesh .

PORE SIZE AND MESH INFECTION : [11]

Based on the pore size the meshes can be broadly divided into four categories :

TYPE 1 : totally macroporous mesh (pore size > 75 microns)

TYPE 2 : totally microporous mesh (pore size < 10 microns)

TYPE 3 : macroporus mesh with multifilamentous or microporous components

TYPE 4 : submicronic pore size (these type of mesh are not suitable for prosthesis implant)

In meshes ,the concept of density which combines fibre diameter ,fibre number which relates it strength also impacts the pore size . in general micropore sized mesh are more proned for infection and devolpment of seromas and erosion and adhesion formation are more associated with macropore sized mesh .

In a micropore mesh the pore size is 10 lm hence the bacteria can easily enter but the leucocytes which are bigger in size 75 lm cannot enter ,hence the bacteria are easily protected from the human body's defense mechanisms .

Macropore meshes also allow a rapid ingrowth of three dimensional collagen fiber network .

MICROORGANISMS : [12]

The most common organisms causing mesh infection belong to the following groups :

Staphylococcus spp (staphylococcus aureus) most common pathogen

Streptococcus spp (group b streptococci)

Gram negative bacteria (enterobacteriaceace)

Anerobic bacteria (including peptostreptococci spp).

Candidal and mycobacterium spp rarely caused any mesh infections in patients .psuedomonas aeroginosa is also a rare pathogen isolated from icu settings in mesh infection .

Usually these pathogen are seeded from the skin contaminants infecting the wound during the procedure . once infected the mesh infection poorly responds to antibiotic therapy .

CLINICAL SIGNS AND SYMPTOMS :

The average time interval between a hernia repair and the onset of infection was found to be two weeks and 39 months .there may be signs of inflammation such as redness ,erythema ,swelling at the site of mesh placement .the patients may present with fever ,chills and rigors .it may present like sinus or a abscess formation .

PREVENTION :

The surgeon should minimise the amount of mesh used since the mesh is a foreign body and a ideal place for bacterial colonisation .hence the most important issue is the amount of mesh used .

In addition four approaches are suggested to decrease the rate of infection ,

1 . The irrigation of the field with an antibiotic containing solution intermittently till the closure of the wound has shown to decrease the rate of bacterial contamination of the mesh and their growth .

2 . Use of a material which releases antibiotis slowly can be used . collagen impregnated with gentamycin has been tried .these are fixed infront of the mesh to the aponeurosis .

3 .The mesh may be impregnated with a antibiotic to decrease the rate of infection .

4 . The use of intravenous antibiotics before surgery have been shown to decrease the rate of infection especially when a prosthesis is involved .

DIAGNOSIS AND TREATMENT :

The clinician should strongly suspect a mesh infection when patients presents with an unexplained fever or inflammatory symptoms after surgery at the site or at the site of surgery even when presenting with unusual symptoms such as abscess or enterocutaneous fistula .

Imaging studies such as ultrasonography ,computed tomography may be used which demonstrate inflammation of the subcutaneous fat surrounding the mesh of different density from that of a seroma .they may also demonstrate a abscess or a fistula .this again emphasis on the fact no diagnostic aspiration of seromas should be done since there is a dangerous possibility of introduction of microorganisms into the seroma risking a mesh infection .

The therapy of mesh infection is a combination of medical and surgical management . monotherapy with antibiotics are of no use or has poor outcome .the microorganisms in response to the prosthesis induce a fibroblastic response which produces a thick capsule around the mesh which subsequently defer the penetration of antibiotic agents .especially staphylococcus produces a biofilm which deters the penetration of antibiotics and host immune response .

When infection is not controlled by medical management ,the only therapy is surgical removal of the mesh and nowadays studies indicate that this varies according to the type of mesh used .when a polypropylene or polyester mesh is used antibiotics and drainage alone may be used but the mesh should be removed in case of a polytetrafluoroethylene mesh .

when there is persistent fever or discharge from the site ,incomplete removal of the mesh should be considered .

RECURRENCE :

Recurrence most commonly occurs at the mesh –fascia interface but less commonly due to the intrinsic failure of the mesh material. Technical failure and failure to identify the correct fascia are the common reasons for recurrence . the mesh placed below the arcuate line in the preperitoneal space such that the mesh and the fascia adherence should be atleast 4 cm so that according to the pascal ‘s principle of hydrostatics it promotes fibroblast proliferation and ingrowth due to pressure apposition principle .

It has been demonstrated that the prolene mesh may shrink 30 % after implantation .when the mesh is placed intraperitonealy it provides a better anchorage and the abdominal wall provides a secure and physiological

repair .recurrences in this type of repair is reported to be less than 10 % and this intraperitoneal inlay technique is been used routinely for both open and laproscopically all over the world .

LAPROSCOPIC TECHNIQUE OF REPAIR :[14]

The patient is placed in a comfortable supine position . general anaesthesia in the form of inhalational anasthetics may be used .an intravenous antibiotic is infused and monitors are placed on both side of the table .the abdomen is decompressed by a nasogastric tube and the skin is sterilised and draped .

Veress needle is introduced in the abdomen to produce the pneumoperitoneum ,it is usually introduced at the palmer's point .palmer's point is a point 3 cm below the left costal margin at the level of the left mid clavicular line ,this is the area where there is a less likely chance of intrabdominal adhesions .10 mm and additional 5 mm ports may be used the alternative sites are right and left iliac fossa and right hypochondrium .a 30 degree telescope is introduced in the 10 mm port .through laproscopy is done to rule out any pathology and if there is no contradiction the surgery is proceeded with reduction of the incarcerated contents from the defect .

Once the contents are reduced the size of the defect is measured using a spinal needle transabdominally since we may overestimate the size when there is pnuemoperitoneum , any additional hernias are noted .to reduce the wrong estimate of the size of the hernia the insufflations pressure is kept to minimum of 8 to 10 mm of hg .

The undersurface of the defect is cleared of the fat for the placement of the mesh .the defect is closed by nonabsorbabble sutures , a suture passing instrument such as ski needle is used to pass the suture transabdominally and the suture is taken out the abdomen and tied at the subcutaneous level . atleast three sutures are used to closed the defect .this technique was previously used by carter to close 10 mm trocar sites and this technique only takes 5 to 10 min additionally to the procedure .

We use proceed mesh to cover the defect atleast 3 cm overlapping should be used .four sutures of 2-0 vicryl or 2-0 prolene are used around the corner of the mesh and the mesh is rolled and inserted into the abdominal cavity .the mesh is unrolled in the abdominal cavity and the polypropylene side is towards the abdominal wall and peritoneum ,the polytetrafluroethylene side is towards the bowel and the omentum . the sutures inside the abdomen are taken outside the abdomen through small stab incisions and tied with square knots , after confirming the adequate overlapping ,any sagging of the mesh is fixed with the help of the tackers

. while doing this procedure the intrabdominal pressure is reduced to 10 mm of hg . complete hemostasis is obtained and pneumoperitoneum is released and the port sites closed with 2-0 vicryl and skin with 2-0 silk .

Rationale of laproscopic repair :

In laproscopic repair the mesh is placed in the intraperitoneal space or the preperitoneal space where the pressure is equally distributed all along the mesh and not on the conventional suture lines which decreases the chance of mesh displacement .when there is an increase in intrabdominal pressure the mesh is kept in place rather being displaced which is the just opposite in case of conventional open onlay repairs .

In open hernia repair it possible for the surgeon to miss any additional hernias and occult hernias ,but in laproscopic hernia the surgeon can easily identify all the defects from the inside and can easily define the defect also .

Extensive dissection is not needed for laproscopic approach to place a good overlapping of the mesh thereby preventing many post operative wound complications when compared to open repair this is particularly useful in obese patients for obvious reasons .

MESH FIXATION :

Mesh fixation techniques in laproscopic ventral hernia repair have been extensively discussed in world literature .the physics of laproscopic repair do not advise tack or any other mesh fixation devices . the tacker is usually 4 mm thick ,the mesh is 1 mm thick and a effective tack penetrates only about 2 mm since most of the patients in laproscopic surgery are obese the use of tackers are controversial .some surgeons advocate that it reduces operating time when compared to sutures .

But recent studies have reinforced the superiority of transfascial sutures over tackers.recent advances in mesh fixation in laproscopic hernia repair like the fibrin sealant has shown to reduce post operative pain ,convalescence and recurrence .

RECURRENCE :

Studies indicate recurrence rate in laproscopic repair to be around 2 % .

Mechanisms of recurrence are

1 .infection

2 .inadequate mesh

3 .lateral detachement of mesh

4 . inadequate mesh fixation

5 . trauma

6 . increased abdominal pressure .

But when the technique of herniorraphy and mesh fixation is used together the rate of the recurrence is found to be decreased .

SEROMA FORMATION :

Seroma formation occurs in any type of hernia repair even in laproscopic approach . the seroma usually occurs above the mesh and in the hernia sac .in a large study conducted the incidence of seroma was found to be 11 .8 % .

In another study conducted the seromas which persists after eight weeks were considered to be a complication and the incidence was found to be 2 .6 % .to reduce the incidence of seromas the technique devolped by carter to close the umbilical defect was used . the defect was closed with absorbable or nonabsorbable sutures or atleast the size reduced .the seromas rarely cause long term complications , only when they reach large sizes aspiration is recommended .it is better to preoperatively counsel the patient about seromas formation after laproscopic repair .

CHRONIC PAIN :

Tackers significantly reduce pain .pain is more in trans abdominal sutures than tackers . the sutures go through the entire abdominal wall and through the muscle .they may cause local ischaemia and may be the reason for severe post operative pain . cob et al discussed that the intercostals nerve may be trapped in the transabdominal sutures .

Some surgeons prefer to use absorbable sutures like vicryl so that these sutures provide adequate strength till the ingrowth of tissue and also prevent accidental long term entrapment of nerves .some surgeons prefer that anti inflammatory drugs and local anaesthesia may be enough to alleviate the symptoms .local exploration and release of the suture at the site of pain has produced dramatic relief in some patients .

POST OPERATIVE MORBITY :

Apart from the causes mentioned above ,other complications such as unintentional enterotomy ,inter bowel loop abscess ,repiratory failure may increase the hospital stay but these are comparable to the open technique .

COST OUTCOMES :

Nowadays cost analysis between open and laproscopic repair of ventral hernia repair are available .in laproscopic hernia the use of dual sided mesh and transabdominal sutures has reduced the post operative pain ,hospital stay ,surgical site infection and the cost are now comparable with the open technique .

However the type of mesh used and type fixation devices used can determine the cost outcome .

USE OF FASCIAL GRAFTS IN HERNIA REPAIR : [6]

The advantage of autologous fascial grafts when compared with non biological prosthesis is that they are easily accepted by the host and do not elicit a foreign body response and incorporate a firm collagenous tissue .they also induce collagen synthesis and remodelling of fibrocollagenous tissue .

Most frequently used graft in the human body is FASCIA LATA GRAFT .it is versatile and strong graft containing dense collagen fibres ,strong enough to resist intrabdominal pressure .the collagen fibres in the fascia lata graft are ideally oriented and they prevent longitudinal slipping of fibrils and fibres . the molecular arrangement in the fascia lata is such that it gives maximum inter cross linking giving it strength .

In the olden days ,fascia lata were being used as living sutures . kirscher was the first person to use fascia lata to bridge fascial defects .in studies done the fascia lata graft was found to viable even after a year after implantation ,and there was ingrowth of vascular tissue shown angiographically in the studies .

Moreover ,gallie and le mersurier found that the fascial implants are envolped by newly formed vascular tissue within three weeks .

In contrast to scar tissue ,which responds to the physical stress by becoming thin and elongated ,fascia lata retains it shape ,with parallel orientation of fibrils as seen in electron micrography .

The fascia lata graft adheres to the adjacent apomyoneuortic structures more easily than the synthetic prosthesis ,and the graft retains the strength for more over than the year .the fascia lata graft also stimulates the synthesis and remodelling of the collagen synthesis . in clinical practice fascia lata grafts have been used to repair abdominal hernias and abdominal defects for over the years .

ANATOMY OF FASCIA LATA : [7]

The fascia lata is a tough fibrous sheath enclosing the thigh like a sleeve . in latin the term tesor fascia lata corresponds to “the muscle that stretches the band on the side “ .

ORIGIN AND INSERTION :

Anteriorly it is attached to the inguinal ligament ,laterally to the iliac crest ,posteriorly to the gluteal fascia to the sacrum ,coccyx and the sacro-tuberous ligament and medialy to the pubis the pubic arch and the ischial tuberosity .

Inferiorly on the front and sides of the knee joint ,the fascia lata is attached to bony prominences and the capsule of the knee joint .

The strong popliteal fossa posteriorly is formed with the fascia lata which continues as the deep fascia of the leg .

The fascia lata laterally is thickened as s 5 cm thick band called iliotibial tract .this tract splits into two layers .the superficial lamina is attached to the tubercle of iliac crest ,and deep lamina to the capsule of the hip joint .the tract below attaches to the lateral condyle of the tibia .the gluteus maximus and the tensor fascia latae attaches to the tract in the upper part .

FUNCTIONS : The tensor fascia latae tenses the fascia lata .it's oblique fibres stabilises the knee joint in extension and in partial flexion ,hence constantly used for walking and running.in erect posture it stabilises the pelvis and in partial flexion in leaning forward position stabilises the knee joint .The tensor fascia lata is also a abductor of the hip joint .

NERVE SUPPLY :

The muscle is supplied by the superior gluteal nerve L4, L5 and S1 .

BLOOD SUPPLY :

The muscle and the fascia lata is supplied by the superior gluteal artery and lateral circumflex artery .

TECHNIQUE OF FASCIA LATA HARVESTING : [9]

The muscle tensor fascia lata to be used as a free musculocutaneous flap was first described by hill ,nahai and vasconez in the year 1978 .

The anterior superior iliac spine and the iliac crest is palpated .a line joining the lateral most part of the iliac crest and the lateral femoral condyle is drawn which marks the course of the fascia lata .

A . HARVEST OF FASCIA LATA THROUGH A LONGITUDINAL INCISION :

1 . A 3 to 5 cm longitudinal incision is marked in the lateral part of the thigh ,such that the the incision is centered in the junction of upper one third and middle one third of the thigh .

2 . The incision is carried down to fascia lata level without harvesting the fat .

3 . The incision is cut laterally and medially which defines the width of the fascia lata graft .

4 . The fascia lata is then removed from the muscle carefully ,the muscle should not be violated in anyway .

5 . After removing the fascia lata graft , the wound is closed in two layers using 2-0 vicryl after keeping the suction which is only kept if necessary .

B . HARVESTING A LONG STRIP OF FASCIA LATA USING FASCIA LATA STRIPPER :[17]

1 . A 4 cm incision is made above the knee joint laterally over the iliotibtial tract .

2 . The incision is deepened to the fascial layer .

3 . An 1.5 cm incision is made over the fascia and a 2-0 silk is attached to the fascia to facilitate the threading the fascia lata stripper .

4 .The stripper is engaged and the stripper is pushed superiorly and several strips can be harvested .

5 . The wound is closed with 2-0 vicryl and penrose drain can be kept if necessary .

When a large flap is raised the disadvantages are herniation of muscle , long scar , instability of the knee joint . when a large flap is raised skin grafting may be necessary to close the raw area .

ROLE OF FASCIA LATA IN REPAIR OF VENTRAL HERNIAS : [10]

In clinical practice ,free fascia lata grafts are used for repair of abdominal hernias and abdominal wall defects .in many reported series ,the grafts were used for reconstruction in a contaminated environment .

In earlier reports ,reherniation rates of 6 to 15 % were found after hernia repair with fascia lata .peacock used free fascia lata as onlay grafts after primary closure of ventral hernias to reinforce the myoaponeurotic wall and stimulate the synthesis of collagen .he found reherniation in only 1 of the 17 patients after a follow up 2 to 5 years .recently ,two larger series of patients with ventral hernias repaired with free fascia lata grafts were reported. Williams et al reconstructed 12 ventral hernias of which 7 of them were done in a contaminated environment .post operative complication included two cases of soft tissue dehiscence (graft intact), two patients with graft breakdown and one patient with a recurrent bowel fistula .reherniation occurred in 1 of the 12 patients .the fate of the patients with graft breakdown and recurrent fistula are not mentioned .

Disa et al performed abdominal wall reconstructions with autologous fascia lat in 32 patients of which 30 were performed in a contaminated field .post operative complications include cellulitis in three ,seroma in two ,and skin dehiscence with exposed fascia grafts in seven patients .in five of the seven patients with a wound dehiscence ,the wound healed by secondary intention ; in two patients graft was covered by split skin graft . Donor site complications occurred in 12 to 18 % of the reported series ; no cases of knee instability were found .

In our study ,this fascia lata is used to repair umbilical hernia through laproscopic inlay

technique alone or along with a synthetic mesh .

MATERIALS AND METHODS

Patients with umbilical hernia attending the government rajaji hospital surgery outpatient department , a total of 42 patients were taken into the study .

Of these patients ,the aspects studied were ,

A . The size of the defect

B . Methods of repair

1 . open primary closure

2 . open mesh repair

3 . laproscopic repair with fascia lata repair

4 . laproscpic repair prolene mesh and fascia lata repair

C . The incidence of infection rate

D . Post operative pain and morbitidy

E . Rate of recurrence .

OBTAINING CONSENT :

All the patients included in the study were explained about the disease and informed about the surgical treatment options and its advantages and disadvantages .

All patients were in good mental health ,understood the procedures and gave written consent for the corresponding treatment to be performed .

SIZE OF THE DEFECT :

The size of the defect was the first parameter to be taken into account .the size of the defect was determined preoperatively by ULTRASONOGRAPHY done in government rajaji hospital during the study period .

Patients having a defect size of greater than 2 cm were considered for open type of repair and patients having defect size of 2 cm and less were considered for laproscopic type of repair .

OPEN TECHNIQUE WITH PRIMARY CLOSURE :

Patients in this category had either size of the defect greater than 2 cm ,or these patients had comorbid factors (uncontrolled diabetes ,uncontrolled hypertension ,old age , obesity)which precluded them to undergo surgical procedure under general anaesthesia or through laproscopy . these comorbid conditions also precluded them for a mesh repair since the chance of mesh infection were greater .

In this technique of repair , the defect was closed primarily with monofilament nonabsorbable suture preferably no 1 prolene suture was used . no drains were kept in this type of repair .

OPEN TECHNIQUE WITH MESH REPAIR :

Patients in this category were patients having defect size greater than 2 cm , hence laproscopic technique of repair in these patients were excluded , but these patients had no comorbid factors like diabetes or obesity and other immunocompromised states with could make them vulnerable to chance of mesh infection .

In this type of repair .the defect was closed with a monofilament nonabsorbable suture preferably no 1 prolene and then hernioplasty was done using a prolene mesh onlay technique . the mesh was fixeusing a monofilament nonabsorable suture preferably no 2 prolene sutures .finally a drain was kept preferably redivac suction drain was kept

LAPROSCOPIC UMBILICAL HERNIA REPAIR WITH FASCIA LATA INLAY GRAFT :

In this group of patients ,those with defect size of less than 2 cm were selected and the patients were adequately assessed preoperatively for general anaesthesia .

Patients were subjected to laproscopic surgery and a 10 mm port made at the left hypochondrium and the defect was closed using monofilament nonabsorbable sutures preferably no 1. Ethilon sutures and reinforced

with proceed mesh which was fixed to the parietal wall using vicryl and prolene sutures ,using extracorporeal knots .

STATISICAL ANALYSIS :

The patients in the study were broadly divided into two groups ,those who underwent open umbilical hernia repair and those who underwent laproscopic umbilical hernia repair .

Pain in the patients was categorized by visual analog scale and the mean hospital duration of days was also taken into account .

Data analysis was done using student t chart .

Subgroup analysis was also done in those groups ,open repair was divided into open primary repair and open mesh hernioplasty repair .laproscopic repair was subdivided into laproscopic fscia lata repair with laproscopic mesh repair with fascia lata inlay graft .

PROFORMA

NAME : AGE : SEX :

IP NO :

DIAGNOSIS :

DURATION OF HOSPITAL STAY :

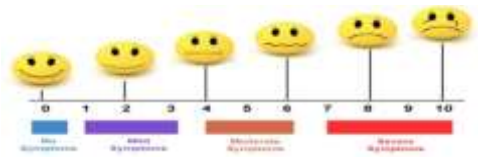
TYPE OF SURGERY : LAPROSCOPIC /OPEN UMBILICAL HERNIA REPAIR

ANASTHESIA USED : GENERAL /REGIONAL ANASTHESIA

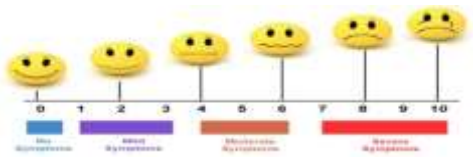
SIZE OF THE DEFECT :

VAS (VISUAL ANALOG SCALE) POST OPERATIVE PAIN :

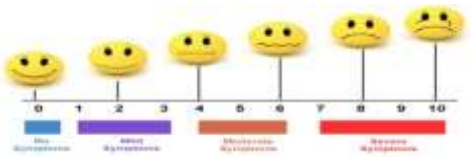
DAY 1 :



Day 2 :



Day 3 :

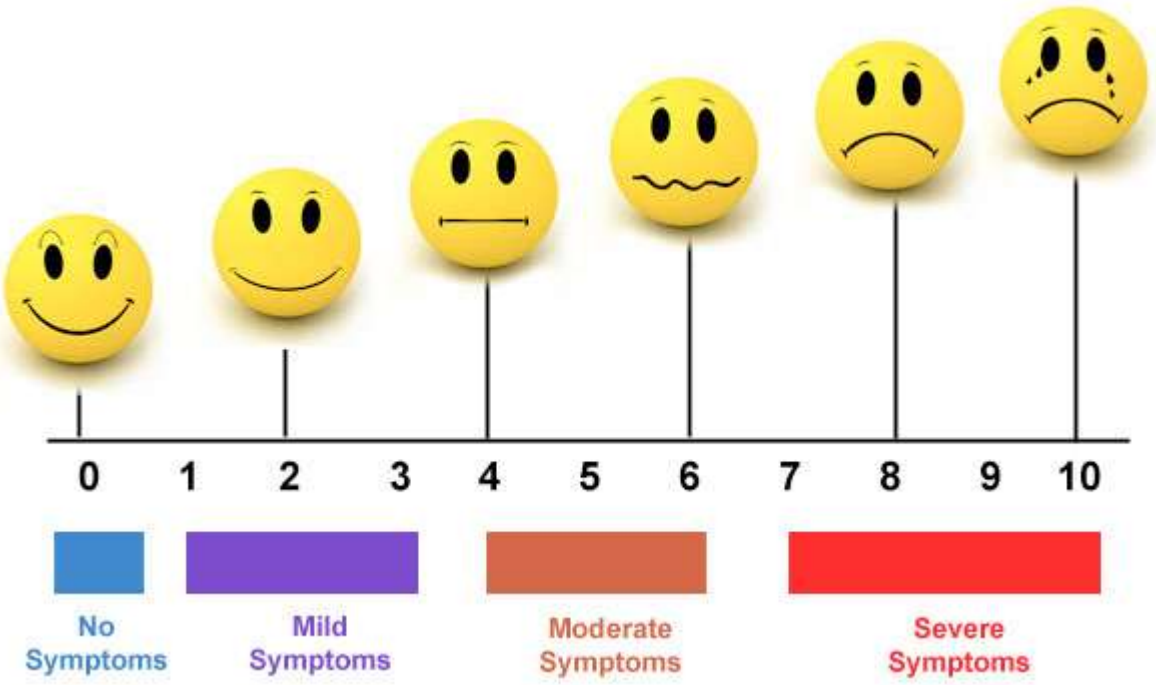


POST OPERATIVE INFECTION : YES /NO

MEDICATIONS USED :

FOLLOW UP :

VISUAL ANALOG SCALE :



ANALYSIS OF DATA

In our study we studied a total of 42 patients with umbilical and paraumbilical hernia ,who are patients in the government rajaji hospital ,Madurai .these patients were admitted in the general surgery wards and followed up.the patients were divided into four groups :

GROUP 1 : PATIENTS WHO UNDERWENT OPEN UMBILICAL HERNIA WITH ONLY PRIMARY REPAIR.

GROUP 2 : PATIENTS WHO UNDERWENT OPEN UMBILICAL HERNIA WITH MESH REPAIR .

GROUP 3 : PATIENTS WHO UNDERWENT LAPROSCOPIC REPAIR WITH FASCIA LATA ALONE .

GROUP 4 : PATIENTS WHO UNDERWENT LAPROSCOPIC REPAIR WITH PROLENE MESH AND FASCIA LATA UNDERLAY TECHNIQUE .

In this study various factors were taken into account and compared for effectiveness between them in open umbilical hernia repair and laproscopic umbilical hernia technique .

The factors compared were :

1 .Age of the patient

2 .Sex of the patient

3 .Type of anaesthesia used

4 .Type of repair done for the umbilical hernia

5 .Pain scoring on the post operative days 1 ,3 ,5 respectively ,using a visual analog chart .

6 .Duration of stay in the hospital

7 .Number of days of antibiotic usage

8 . The rate of surgical site infection

9 . The recurrence rate .

In this study ,about seven (7) patients underwent open umbilical hernia repair by primary closure technique ,and about fifteen (15) patients underwent open repair using mesh hernoiplasty technique .six (6) patients had their umbilical hernia repaired by laproscopic method with fascia lata repair and fourteen patients had their umbilical hernia repaired by laproscopic repair by prolene mesh with fascia lata technique .

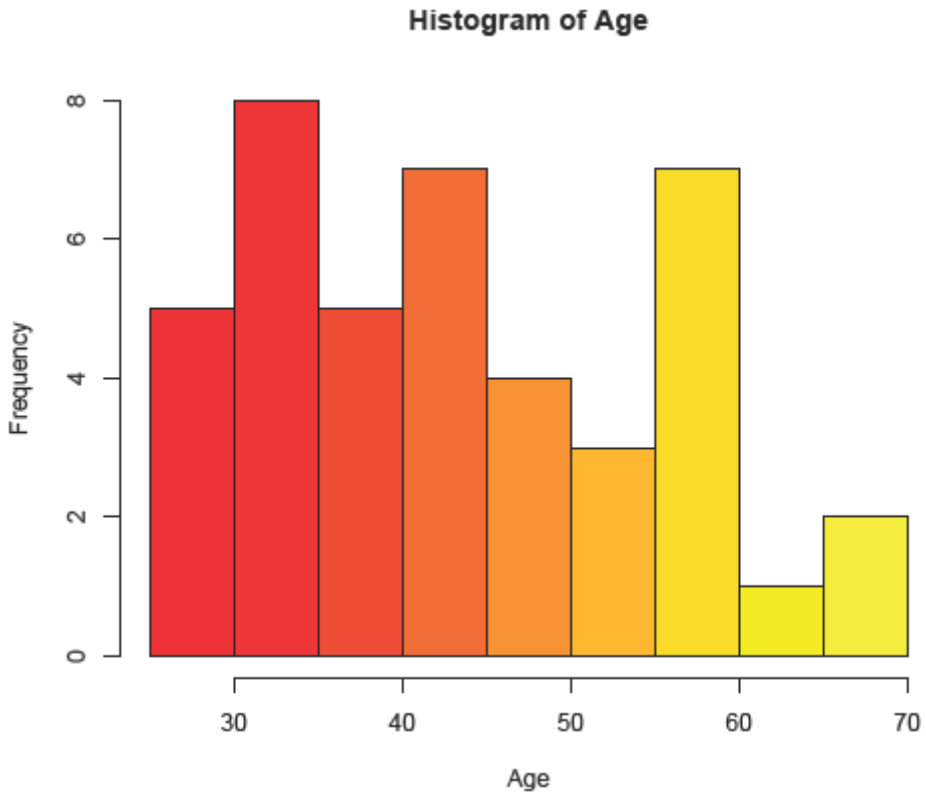
In this study since the data was not equally distributed , WILCOXON RANK SUM TEST (a non parametric test) was used .

DISCUSSION

TABLE 1 :

AGE DISTRIBUTION

AGE DISTRIBUTION	NO OF PATIENTS
21 -30	5
31 – 40	13
41 – 50	11
51 – 60	10
61 – 70	3

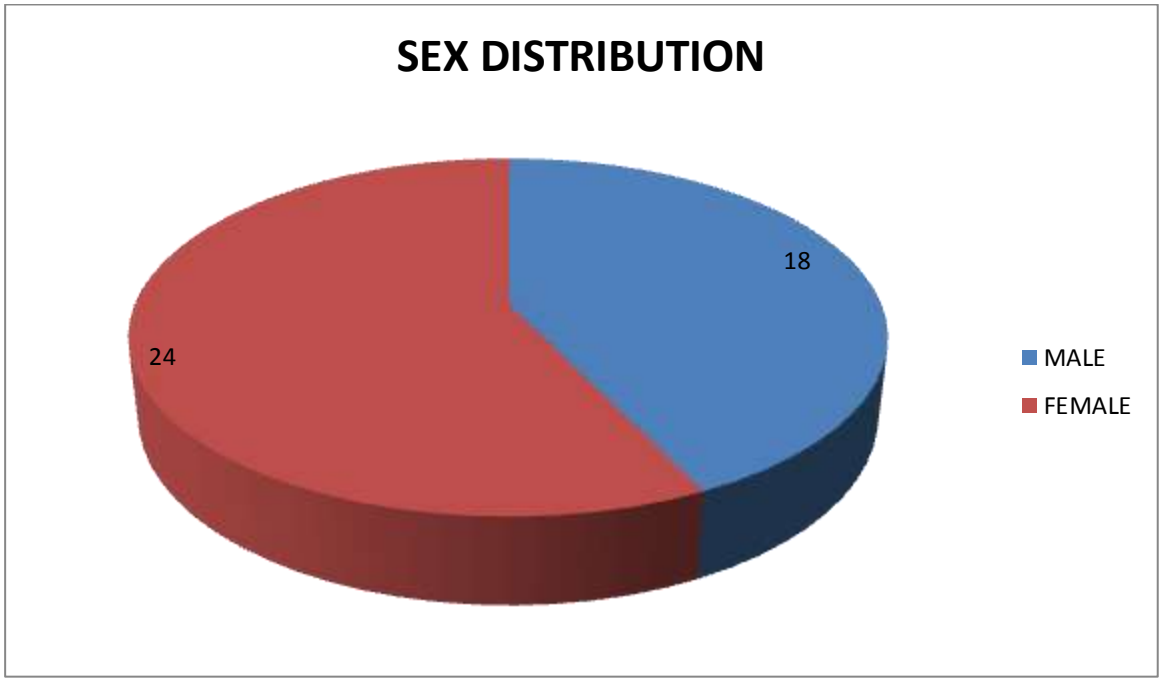


In our study the patients with umbilical hernia predominantly belonged to the age group between 31 – 40 and the second most common was the age group 41 – 50 .

Studying the world literature ,umbilical hernia in adults are more common in the middle aged persons and women in their reproductive age group with multiple pregnancies are more vulnerable . as such the incidence of umbilical hernia is less studied around the world ,but the fact that children especially infants (African descent) and premature infants are more likely to devolp umbilical hernias .this is validated by the study " umbilical hernia in xhosa infants and children " in the year 1982 presented in the journal of the royal society of medicine .

ble 2 : SEX DISTRIBUTION

SEX OF PATIENTS	FEMALE	MALE
NO OF PATIENTS	24	18



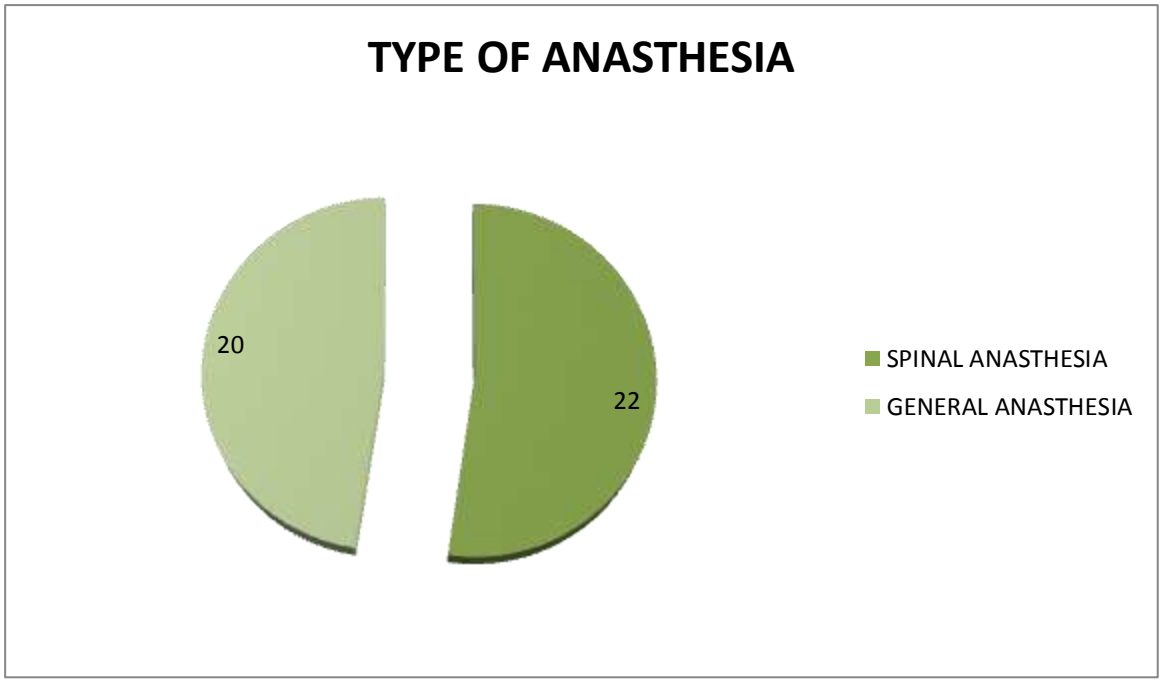
In our study of 42 patients , majority of the patients were females (24) and males were only 18 in the study .

Worldwide the incidence of umbilical hernia in adults shows the predominance in the female sex ,with female to male ratio approaching 1.7 :1 (golladay)this is validated from the article : abdominal hernias : by the author Eustace s golladay in the year 2007 .the reasons for this female predominance is unclear but may be due to the increased

stretching of the abdominal wall during multiple pregnancies . In our study also females have a higher incidence than males corresponding to world literature.

TABLE 3 : TYPE OF ANASTHESIA

GENERAL ANASTHESIA	SPINAL ANASTHESISA
20 PATIENTS	22 PATIENTS



In our study ,about 22 patients undergoing open repair underwent the surgery under spinal anaesthesia , and 20 patients who had laproscopic surgery had it done under general anaesthesia .

Usually if the defect is smaller and the umbilical hernia repair is to be done under open technique the preferred anaesthesia is spinal or epidural anaesthesia as it provides excellent relaxation for the dissection of tissues . but in laproscopic surgical repair and in small babies and infants general anaesthesia is required .

TABLE 4 : TYPE OF SURGERY

TYPE OF SURGERY	OPEN REPAIR	OPEN HERNIOPLASTY	LAP FASCIA LATA REPAIR	LAP HERNIOPLASTY AND FASCIA LATA
NO OF PATIENTS	7	15	6	14

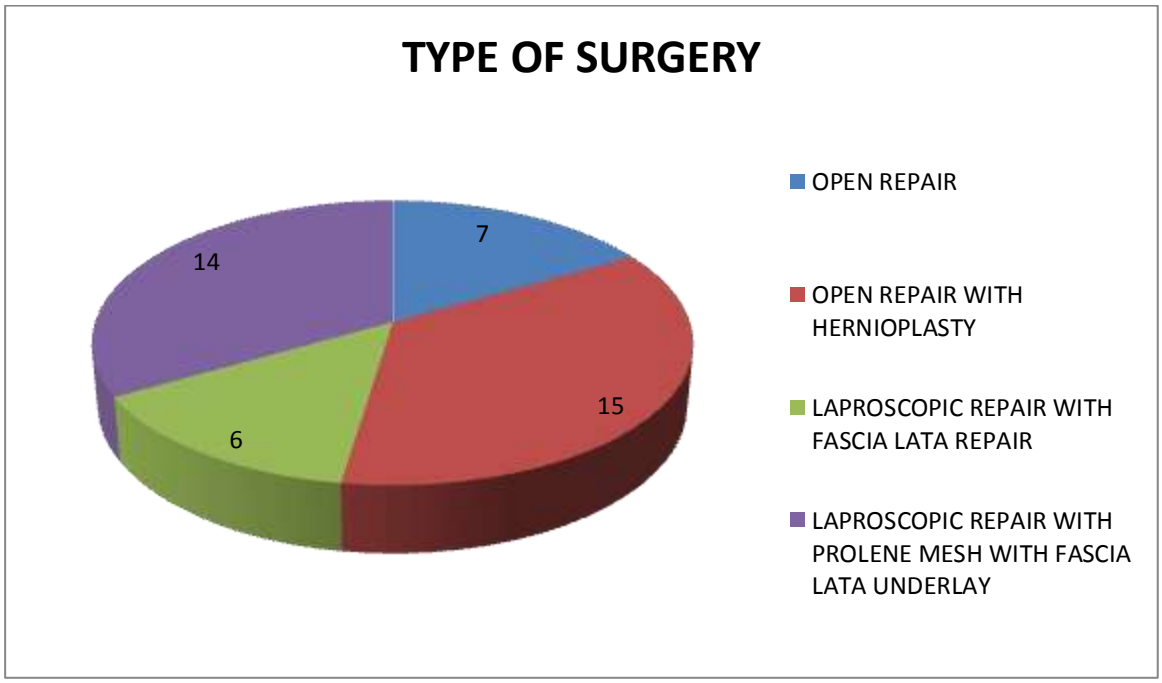
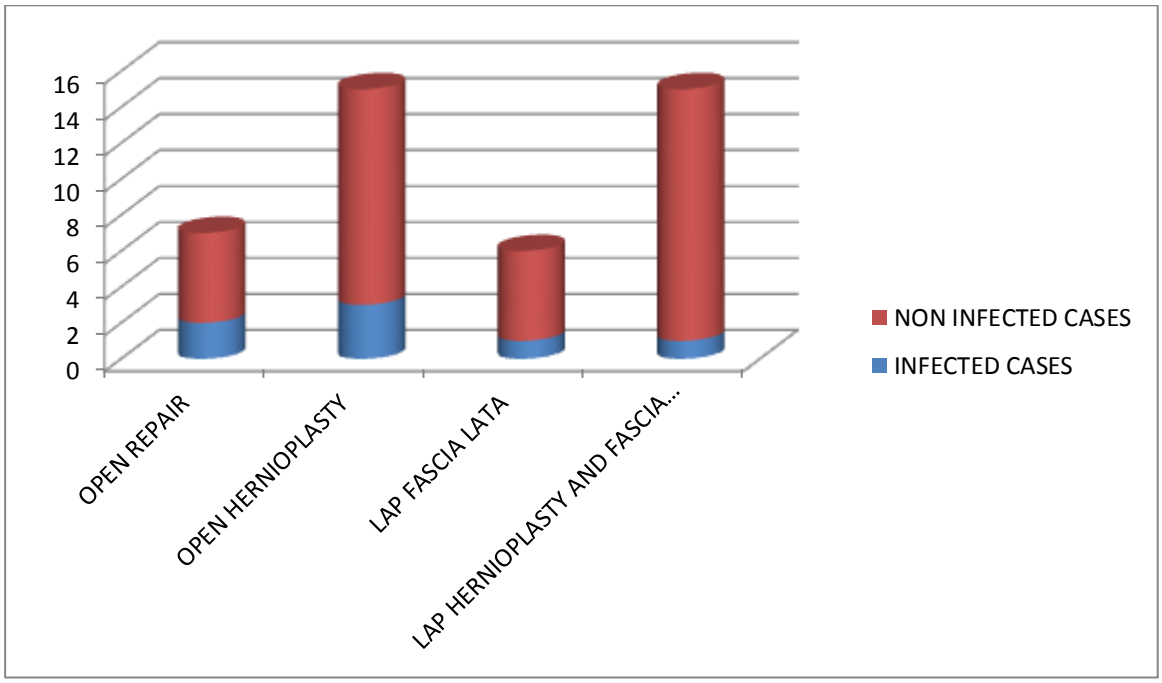


TABLE 5 : INFECTED CASES

TYPE OF SURGERY	OPEN REPAIR	OPEN HERNIOPLASTY	LAP FASCIA LATA REPAIR	LAP MESH AND FASCIA LATA	TOTAL
NO OF CASES	7	15	6	14	42
NO OF INFECTED CASES	2	3	1	1	7



In our study ,in the 42 cases presented , two cases got infected in the group 1 open technique with primary repair and three (3) cases got infected in group 2 the open technique of repair with hernioplasty and one case (1) in each group 3 and 4 the laproscopic fascia lata repair and the laproscopic repair with mesh and fascia lata repair .

Since the infected cases were too small in number .chi square test could not be done .hence the percentage of infection in the open and laproscopic group was studied ,the percentage of cases infected in our study in the open repair technique was around 22 % and the percentage of infection in the laproscopic cases was around 10 % .

The reasons for more infection in the open repair may be due to the excess dissection and possible seroma formation with secondary infection , the umbilicus unlike the other areas in the abdominal wall is less adequately supplied by the blood vessels hence deceased entry by the body immune mechanisms .

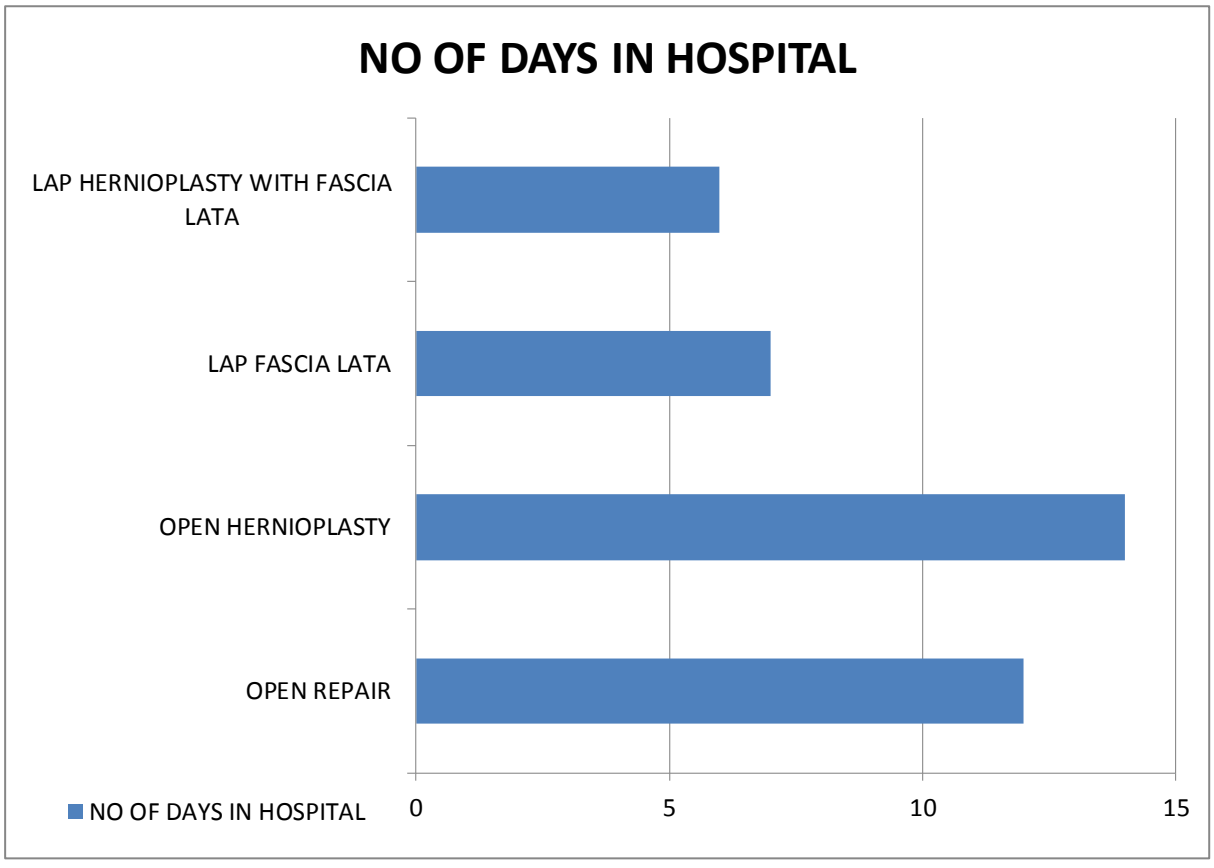
Excess dissection of the umbilicus from the flap may cause it to undergo necrosis and increase the chance of infection .this is avoided in laproscopic repair .the umbilicus also is a well known area to harbour pathogens which increase the chances of infection .[19]

Most of the cases which got infected are of superficial type of SSI ,and these were treated with antibiotics and saline dressing alone . in our study the open repair group had a higher rate of infection than the laproscopic cases . Other studies around the world too indicate the increased incidence of infection in the open technique such as the prospective study done in the department of surgery ,faculty of medicine ,tanta university ,eygpt and another study where 150 cases of open umbilical hernia repair was studied in the department of surgery ,Houston texas USA in the major veterans administration medical centre .

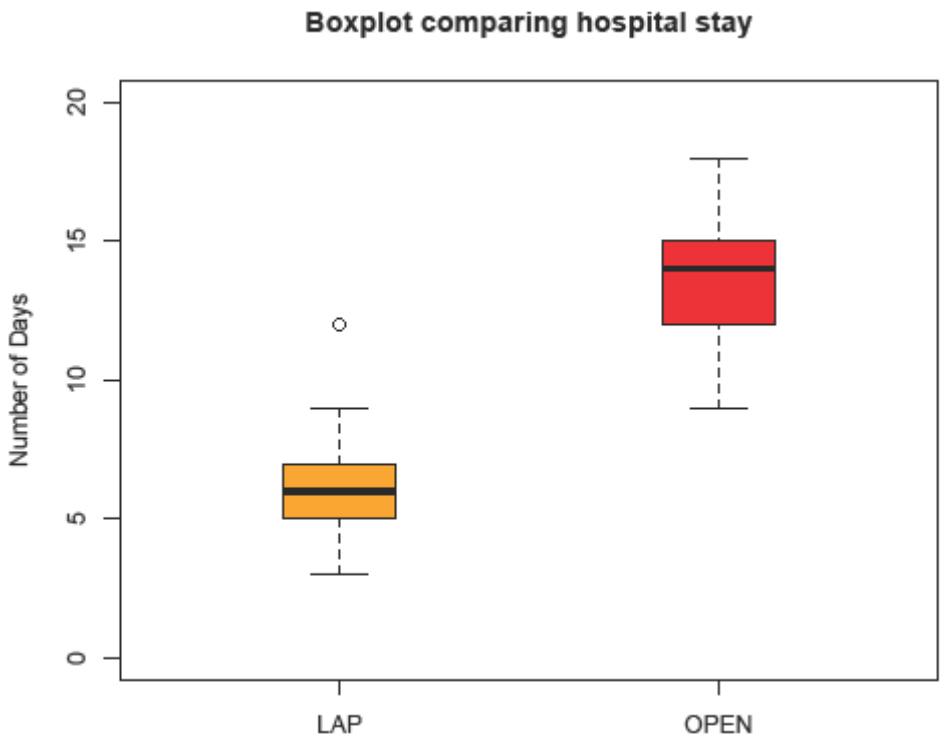
TABLE 6 : COMPARISION OF HOSPITAL STAY

TYPE OF SURGERY	OPEN REPAIR	OPEN MESH REPAIR	LAP FASCIA LATA	LAP MESH WITH FASCIA LATA REPAIR
AVERAGE DURATION OF STAY	12	14	7	6

BAR DIAGRAM DEPICTING THE DURATION OF STAY OF EACH TYPE OF REPAIR :



BOX PLOT DEPICTING DURATION OF STAY :



In our study the duration of hospital stay between the open and laproscopic umbilical hernia groups were studied .

The dark line in the boxplot indicates the median line and the lines above and below indicate the intercordial lines and the whiskers above indicate the maximum and minimum values .

Hospital Stay vs Surgery Type

Wilcoxon rank sum test with continuity correction

data: HS by SurgeryType

W = 7, p-value = 7.565e-08 (This number is given in scientific notation meaning 7.565 x 10 ^ (-8).

That is a very low number almost equal to zero.(the p-value as 0.00 i.e highly significant.)

The median for the laproscopic cases was six (6) and the median value for open cases was fourteen .

The p value is almost zero making it highly significant .

The patients undergoing umbilical hernia repair by laproscopic technique had a lesser hospital stay than when compared to patients undergoing open umbilical hernia repair .

Various studies have been done in this context , which is in favour of our study caluculations done by olmi 2007 says that shorter hospital stay after laproscopic surgery makes the surgery also cost efficient .

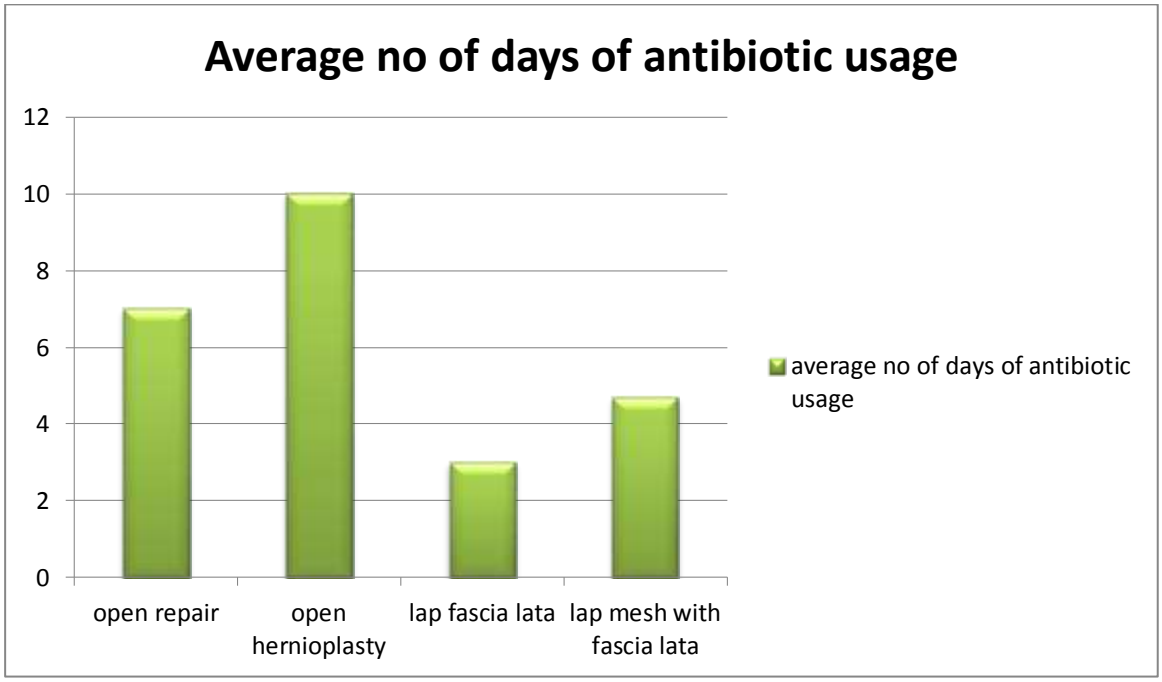
In other non randomised studies done they too report a lesser hospital stay (wright 2002 ;Gonzalez 2003 ,lau 2003) .

In another study , laproscopic and open umbilical hernia repairs published in the year 2003 october in journal of society of laproendoscopic surgeons .

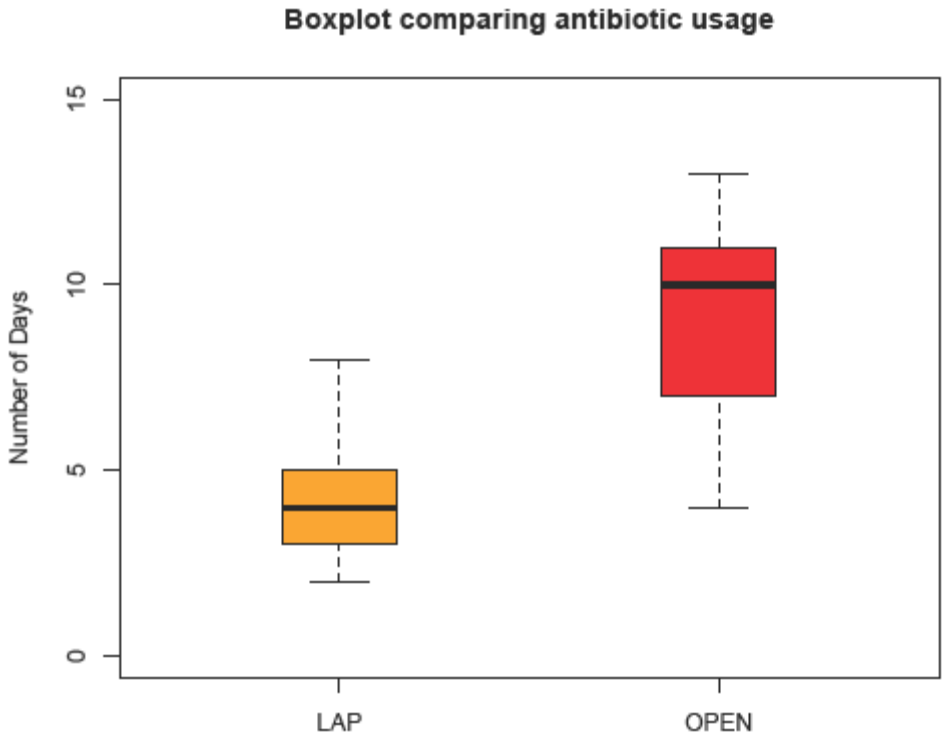
TABLE 7 : DURATION ANTIBIOTIC USAGE :

TYPE OF SURGERY	OPEN REPAIR	OPEN MESH REPAIR	LAP FASCIA LATA	LAP MESH WITH FASCIA LATA
AVERAGE NO OF DAYS OF ANTIBIOTICS GIVEN	7	10	3	4.71 DAYS

Bar diagram depicting antibiotic usage :



BOXPLOT DEPICTING ANTIBIOTIC USAGE :



In our study the number of days antibiotics were given was studied between the groups of open and laproscopic repair and the values evaluated .the duration of antibiotic use was greater in the open group than the laproscopic repair group .

Antibiotic Days vs Surgery Type

Wilcoxon rank sum test with continuity correction

data: ABX by SurgeryType

W = 36, p-value = 3.06e-06

The p value is almost equal to zero hence making it significant .

The median for laproscopic group was four (4) and the median for open group was ten (10) .

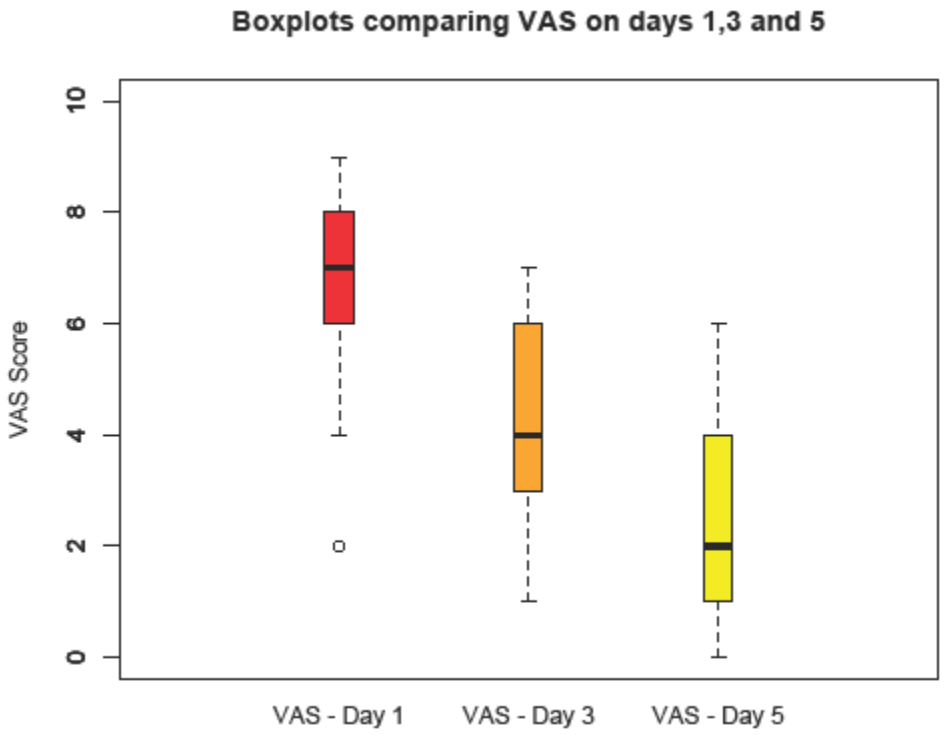
The higher the chance of infection and dissection , paves way for increased usage of antibiotics . more amount of antibiotics cause increased morbidity to the patient .preoperative use of antibiotics will help the prevention of infection and decrease the morbidity associatd with the procedure.

Excess use of antibiotics may also lead to the increasing occurrence of multidrug resistant organisms .it is also emphasised that antibiotics are only adjuvant strict asepsis should be adhered to .

Studies like the laproscopic repair of ventral hernias in the year 2008 published in the annals of surgery also conclude that antibiotics use is in greater need for open than laproscopic surgeries .

TABLE 8

COMPARING PAIN USING VISUAL ANALOG SCORING TABLE USING BOXPLOT



In our study , the pain score was evaluated in the patients by the visual analog scale depicted in the proforma chart .the pain was measured in the first ,third and fifth post operative day .

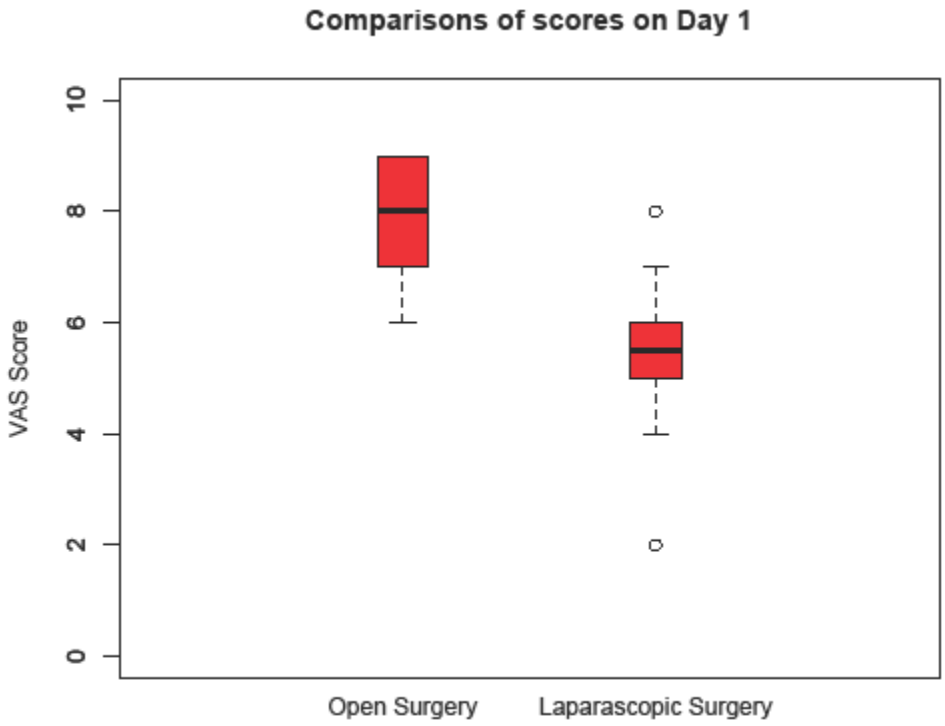
The patients who were operated for umbilical hernia by the open technique had higher pain scores throughout the study when compared to the patients who underwent laproscopic surgery .

The open technique produces extensive dissection ,leading to seroma or hematoma formation causing increased pain and post operative morbidity .use of diathermy also causes pain ,but when compared to the laproscopic surgery there is less dissection hence less pain and morbidity .the incision length also influences the pain .

One study ,clinical study laproscopic umbilical hernia repair by department of surgery ,Bangalore medical college also supports our study and it also states that use of tackers and absorbable sutures may decrease the incidence of chronic pain in laproscopic cases .

In another study conducted by the department of general surgery Baltimore university of Maryland school ,supports our study that the laproscopic surgery is superior in terms of post operative pain when compared to open umbilical hernia .

COMPARING PAIN SCORES ON DAY 1:



VAS 1 vs Surgery Type

Wilcoxon rank sum test with continuity correction

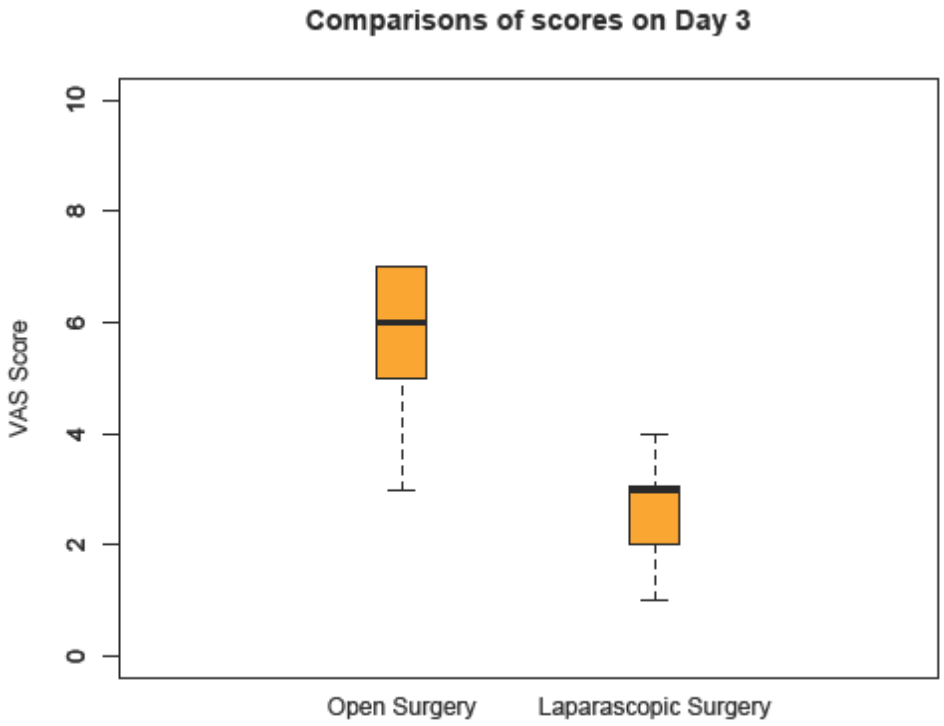
data: VAS1 by SurgeryType

W = 31, p-value = 1.357e-06

The p value is almost zero hence making the study highly significant .

The median value for laproscopic surgery is 5.5 and the median value for open repair is 8.0 .

COMPARING PAIN SCORES ON DAY 3 :



VAS 3 vs Surgery Type

Wilcoxon rank sum test with continuity correction

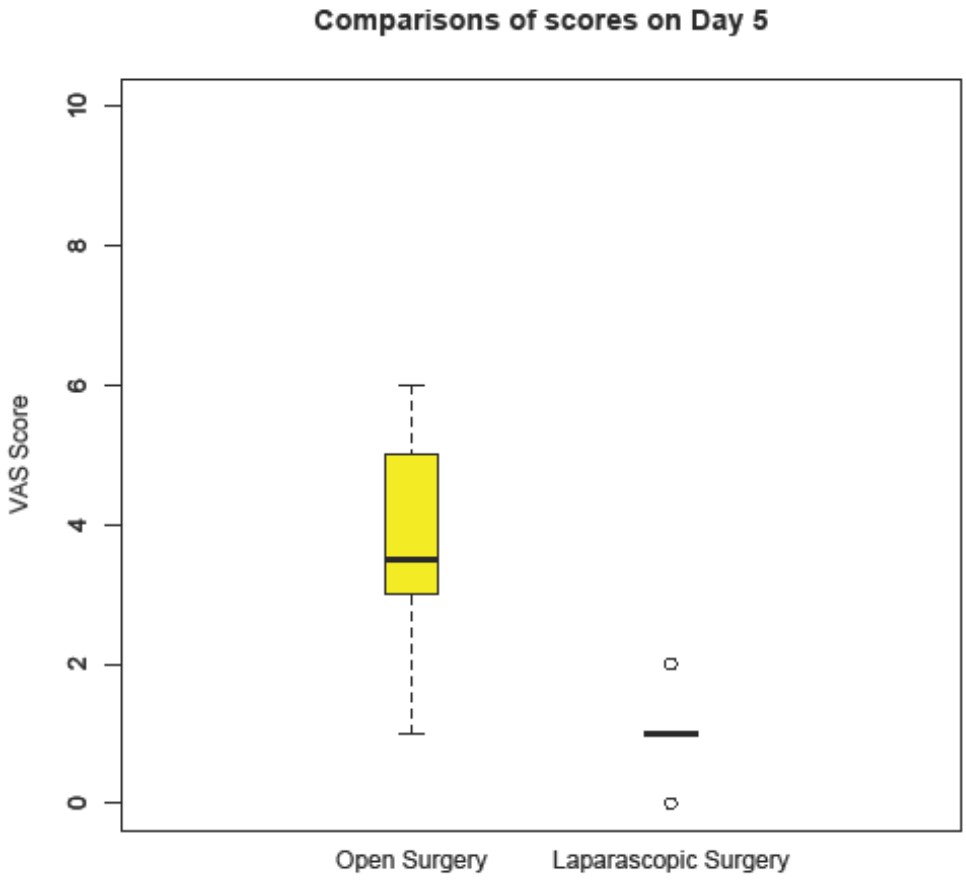
data: VAS3 by SurgeryType

W = 17.5, p-value = 2.206e-07

Again p value is significantly lower .

The median for laproscopic and open surgery is three (3) and six (6) respectively.

COMPARING PAIN SCORES ON DAY 5 :



VAS 5 vs Surgery Type

Wilcoxon rank sum test with continuity correction

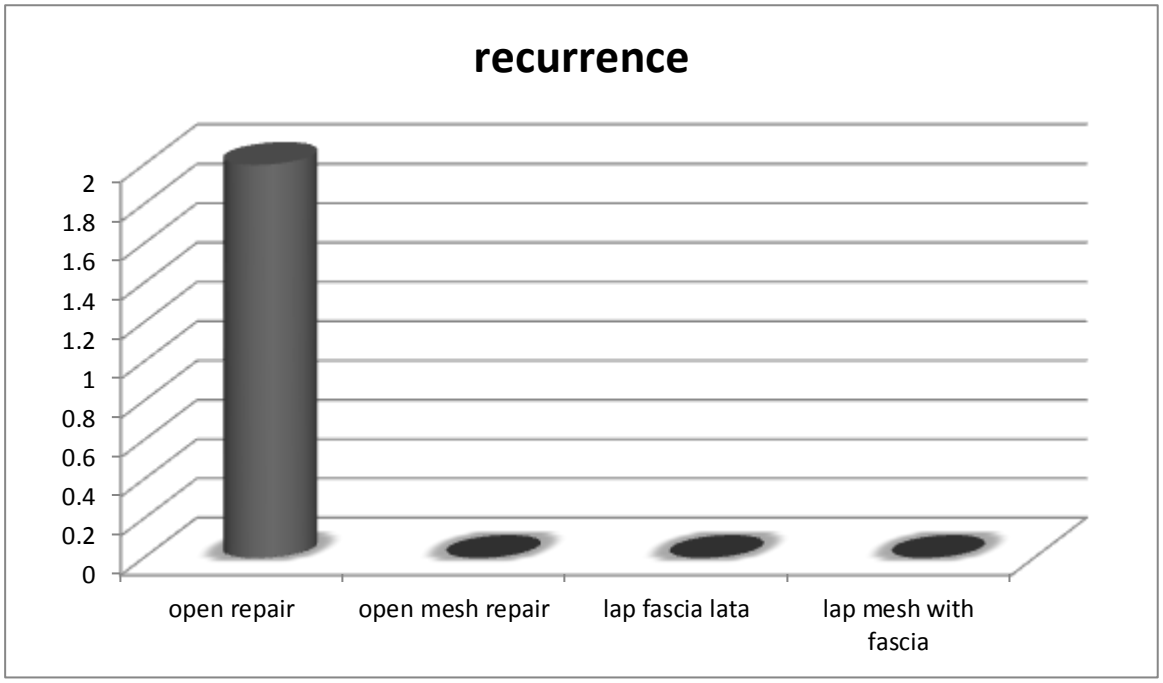
data: VAS5 by SurgeryType

W = 31.5, p-value = 8.677e-07

P value is significant .

The median value for laproscopic and open hernia repair is one(1) and three and a half (3.5) .

Since in our study , the no of recurrence is small ,chi square test could not be performed .there were two cases of recurrence in the open repair group .the patients presented with recurrence after period of eight months and six months respectively both of them were patients with chronic obstructive pulmonary patients with severe under nourishment .



SUMMARY

ALBERT EINSTEIN quoted " The only source of knowledge is experience ." .

The repair of umbilical hernia is still a challenge to various surgeons around the world .the mayo's repair could not stand the test of time due to it's higher recurrence rate .the open technique with primary repair has a high recurrence rate and is not feasible for repair of larger hernias.

The technique of umbilical hernia by open and mesh repair has relatively low recurrence [20] rates , but there is a higher rate of pain due to dissection ,postoperative seroma / hematoma ,increased morbidity and longer stay in the hospital and loss of valuable manpower .

Whereas the laproscopic methos of repair is a safe and effective method of repair for umbilical hernia .

Even though they have a increased surgery time and questionable cost – benefit ratio,they are of more use in obese patients .

In general laproscopic surgery resulted in less post operative pain ,sooner return to normal activity ,lesser rate of surgical site of infection ,less recurrence ,compared to this the cost benefit ratio is comparable to open surgery.

The use of fascia lata is been already done in the world literature .

Eventhough the size of the mesh is taken into account in this study , it is found out that laproscopic repair can be done even foe larger hernias and

multiple defects .

But it’s use along with the prolene mesh ,is a revoluntionary idea in that the prolene mesh provides immediate strength and the fascia lata being autologous ,gets easily incorporated and provides the framework and induces collagen synthesis and remodelling of the fibrocollagenous structure,in a shorter duration thereby fixing the mesh –abdominal wall interface easily,and reducing the rate of recurrence .

CONCLUSIONS

LAPROSCOPIC SURGERY IS A EFFECTIVE , SAFE AND ALTERNATIVE METHOD FOR THE REPAIR OF UMBILICAL HERNIA WHEN COMPARED TO THE CONVENTIONAL OPEN METHOD OF REPAIR , IN TERMS OF LESSER RATE OF SURGICAL SITE OF INFECTION ,LESSER RECURRENCE ,LESS POST OPERATIVE PAIN AND MORBIDITY .

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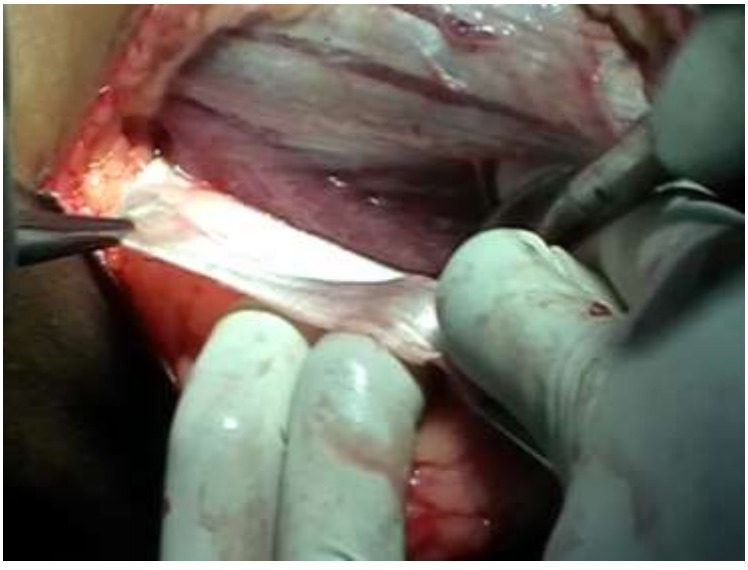
LAPROSCOPIC REPAIR OF UMBILICAL HERNIA USING PROLOENE MESH AND FASCIA LATA GRAFT :

FASCIA LATA HARVESTING :

INCISION :

HARVESTING :



AUTOLOGOUS FASCIA GRAFT :

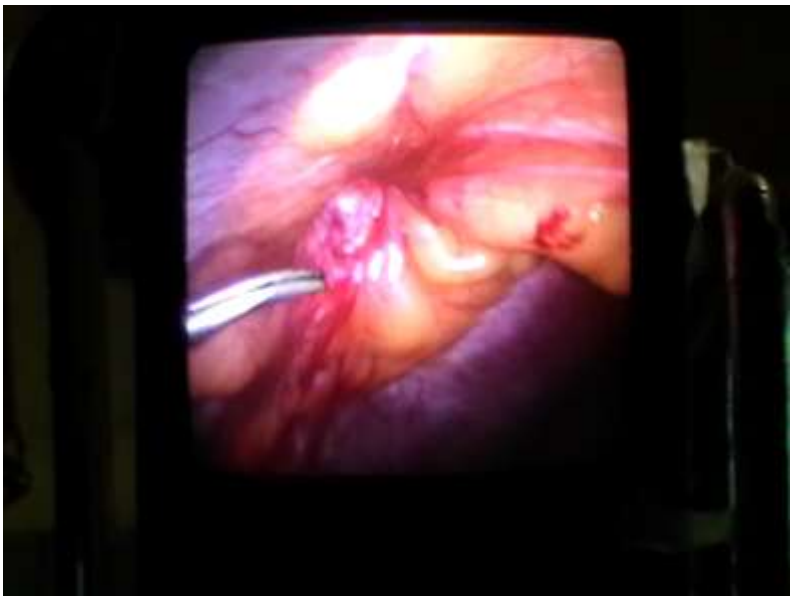
PROLENE MESH WITH FASCIA LATA INLAY GRAFT :

PROLENE MESH FIXED TO FASCIA LATA WITH PROLENE SUTURES :

PALMER'S POINT :

OMENTAL ADHESIONS :

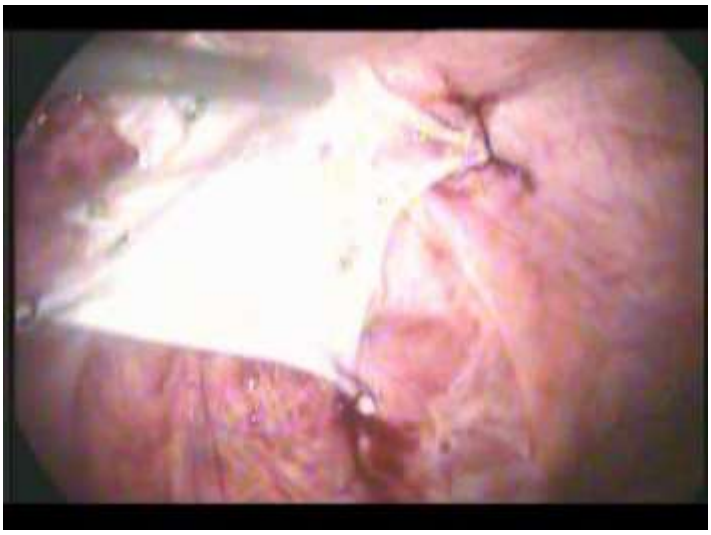
DEFECT :



DEFECT CLOSED WITH NONABSORBABLE SUTURES :

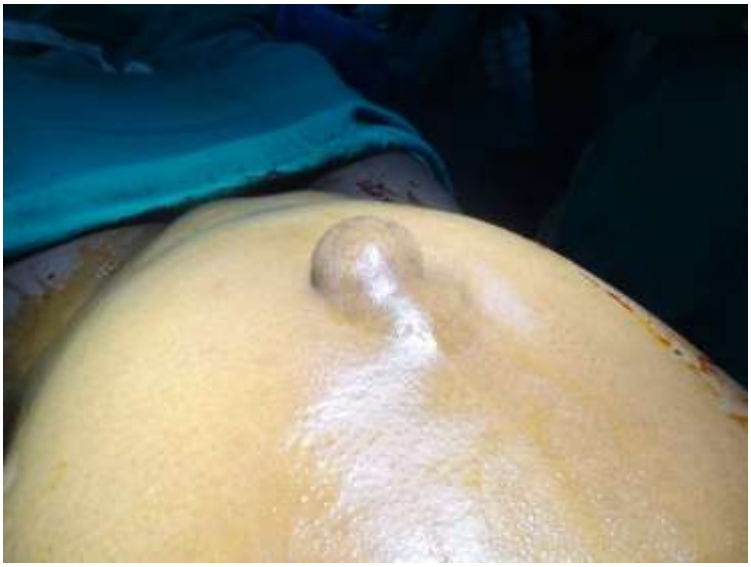
INTRODUCING THE MESH :

MESH WITH FASCIA LATA FIXED TO THE ABDOMINAL WALL :



UMIBLICAL HERNIA OPEN REPAIR WITH ONLAY MESH :

PREOPERATIVE PICTURE :



DISSECTION OF THE SAC :

REDUCING THE CONTENTS AND CLOSURE OF THE DEFECT

ONLAY MESH REPAIR :

FIXATION OF THE UMBILICUS :

SL NO	NAME	AGE	SEX	IP NO	DIAGNOSIS	TYPE OF SURGERY	ANASTHESIA	VAS DAY 1	VAS DAY 3	VAS DAY 5	DURATION OF STAY	INFECTION	ANTIBIOTIC DAYS	FOLLOW UP
1	SINGAMMAL	60	F	39865	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	8	5	3	11	NO	7	no
2	VADIVU	60	F	41650	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	7	3	1	15	YES	4	no
3	GURUSAMY	70	M	60930	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	8	5	3	10	NO	7	recurrence
4	KARUPPIAH	56	M	72420	PARAUMBILICAL HERNIA	OPEN REPAIR	SPINAL	7	3	1	14	NO	4	no
5	SALALUDHEEN	55	M	83921	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	9	7	5	9	NO	10	no
6	DHANALAKSHMI	68	F	15152	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	8	5	3	12	YES	7	recurrence
7	SARABEGUM	45	F	36399	UMBILICAL HERNIA	OPEN REPAIR	SPINAL	9	7	5	13	NO	10	no
8	NAINTHAL	51	F	38869	PARAUMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	9	7	6	15	NO	11	no
9	DHANAPANDIAN	59	M	52828	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	9	7	6	16	YES	13	no
10	MUTHULAKSHMI	28	F	70847	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	4	14	NO	10	no
11	MUTHU	50	M	77472	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	9	7	6	18	NO	13	no
12	MURUGAN	58	M	78221	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	9	7	6	16	YES	12	no
13	SAKILA	45	F	29481	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	9	7	5	17	YES	12	no
14	SEKAR	38	M	6534	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	7	5	3	12	NO	10	no
15	AMBIKA	57	F	11788	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	4	14	NO	12	no
16	RAJESHWARI	35	F	27019	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	4	14	NO	8	no
17	AMUTHA	34	F	80582	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	6	5	1	10	NO	7	no
18	SAROJA	40	F	69674	PARAUMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	7	4	2	12	NO	6	no
19	RASATHI	40	F	72932	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	7	5	4	11	NO	7	no
20	PITHAIMUTHU	50	M	66450	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	3	13	NO	10	no
21	VIBHUSNAN	65	M	75514	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	3	14	NO	9	no
22	MURUGAN	45	M	83214	UMBILICAL HERNIA	OPEN MESH REPAIR	SPINAL	8	6	3	14	NO	10	no
23	GOVINDAMMAL	42	F	36567	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	6	3	1	9	YES	8	no
24	SELVI	27	F	44867	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	2	1	1	6	NO	2	no
25	RENUKA	38	F	49796	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	2	2	1	5	NO	2	no
26	ANGAMMAL	30	F	75718	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	4	2	1	7	NO	2	no
27	ANNALAKSHMI	30	F	66325	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	4	1	1	8	NO	2	no
28	KADHAR PATHCHA	55	M	75504	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA REPAIR	GA	6	3	1	7	NO	2	no
29	SUBRAMANI	45	M	62465	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	8	4	2	12	YES	8	no
30	SURESH	31	M	77271	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	6	3	1	6	NO	5	no
31	IRULAYEE	50	F	78727	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	6	3	1	5	NO	4	no
32	JAMES	41	M	72210	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	2	0	6	NO	4	no
33	SHANTHI	35	F	78662	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	3	1	3	NO	4	no
34	MUTHULAKSHMI	33	F	20301	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	3	1	4	NO	4	no
35	ILANGESHWARAN	40	M	21268	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	2	0	4	NO	4	no
36	SUBRAMANIYAN	45	M	21960	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	3	1	6	NO	5	no
37	RAVICHANDRAN	32	M	35160	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	6	3	1	5	NO	4	no
38	RENGUDEVI	31	F	47145	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	5	2	0	7	NO	4	no
39	PAYAMMAL	30	F	30910	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	7	4	2	8	NO	5	no
40	MENAKA	60	F	60719	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	8	4	2	6	NO	5	no
41	TAMIL SELVI	35	F	64880	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	6	3	1	6	NO	5	no
42	RAJATHI	50	F	79110	UMBILICAL HERNIA	LAPROSCOPIC FASCIA LATA MESH REPAIR	GA	7	3	1	6	NO	5	no